DOCUMENT RESUME

ED 244 907 SP 024 250

AUTHOR MacDonald, Donna, Comp.; And Others
TITLE Nutrition and Fitness Manual: A Summary of Research and Resources.
INSTITUTION Ryerson Polytechnical Inst., Toronto, (Ontario). Nutrition Information Service.
REPORT NO ISBN-0-919351-10-7
PUB DATE 83
NOTE 125p.; Also available as part of "Nutrition and Fitness Kit: A Summary of Research and Resources," which includes posters and pamphlets.
AVAILABLE FROM Nutrition Information Service, Ryerson Polytechnical Institute Library, 50 Gould Street, Toronto, Ontario, M5B 1E8 (Manual--$6.95 or $6.00 prepaid; Kit--$9.95 or $9.00 prepaid).
PUB TYPE Guides - Non-Classroom Use (055) -- Reference Materials - Bibliographies (131)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Athletes; Curriculum Development; *Dietetics; Eating Habits; Educational Media; Elementary Secondary Education; Foreign Countries; Instructional Materials; *Life Style; *Nutrition; Obesity; *Physical Fitness; *Resource Materials
IDENTIFIERS Canada

ABSTRACT

Intended for use by fitness instructors, coaches, nutritionists, and other program leaders, this five-section manual covers topics ranging from curriculum guides for elementary school children to dietary regimes used by professional athletes. The role of nutrients and the use of Canada's Food Guide are reviewed briefly in the first section. Relationships between nutrition and fitness-related lifestyle factors and health status are summarized in section 2. The third section provides an overview of energy balance as it specifically relates to weight control; diet and exercise are considered. The effects of nutrition on athletic performance are examined in section 4. Each of these four sections is referenced and supplemented by recommended reading lists. The fifth section provides additional recommended background references. Material is classified by the type of resource: curriculum guides, teaching aids and audiovisuals, periodicals, and organizations. (JD)

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NUTRITION AND FITNESS MANUAL:

A Summary of Research and Resources

compiled by

Donna Mac Donald
Roxanne Buckle
and
Rosemary Berardi

NUTRITION INFORMATION SERVICE
Ryerson Polytechnical Institute
Toronto
1983

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Canadian Cataloguing in Publication Data

MacDonald, Donna, 1956-
Nutrition and Fitness Manual
ISBN 0-919351-10-7

1. Physical fitness-Nutritional aspects-Study and Teaching.
2. Physical fitness-Nutritional aspects-Bibliography.
3. Nutrition-Study and teaching.
4. Nutrition-Bibliography.
I. Buckle, Roxanne, 1961-
II. Berardi, Rosemary, 1959-
III. Ryerson Polytechnical Institute. Library. Nutrition Information Service.

GV361.M3 613.7'07 C83-098745-2

ISBN 0-919351-10-7 Printed in Canada

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FOREWORD

Investigation into the relationship between diet and disease has resulted in a heightened consiousness of the roles which nutrition and fitness play in our health status. As a result, a new business area has developed: fitness classes, weight-loss clinics, and a multitude of other services and products have been made available to consumers by the "health" industry. Individuals concerned with making positive lifestyle changes are often confronted by contradictory information. A popular book claims that megadoses of vitamins are not necessary; a talk show guest claims they are essential. One 'expert' maintains bee pollen enhances athletic performance while a nutritionist disagrees. The truth of the matter may often seem elusive.

Science has investigated many of the claims and issues surrounding the fitness/nutrition area. However, translating clinical research into practical life situations is no easy task. This publication represents a general overview of current research and provides extensive references to further information. An attempt has been made to recognize the synergistic relationships between nutrition and fitness and their role in the wholistic continuum of lifestyle and health.

Intended for use by fitness instructors, coaches, nutritionists and other program leaders, Nutrition and Fitness Manual covers topics ranging from curriculum guides for elementary school children to dietary regimes used by professional athletes.

ACKNOWLEDGEMENTS

Funding for the production of this manuscript was p[illegible]rovided by both the Ryerson Polytechnical Institute Library and the Ontario Stu[illegible]dent Assistance Program (OSAP) Work - Study Program.

Appreciation is extended to all the publishers and [illegible]distributors who provided review copies of books, films, and other materials. [illegible]Our knowledge of information from the following organizations is gratefully ack[illegible]owledged:

American Heart Association of Washington
Best Foods Division, The Canada Starch Company
The California Raisin Advisory Board
Canadian Paediatric Society
The Dannon Company
Fitness and Amateur Sport Canada
Health and Welfare Canada, Health Promotion Branch
Kraft, Inc.
Lincoln University Cooperative Extension
Mutual Life of Canada
Ontario Egg Producers' Marketing Board
Ontario Heart Foundation
Ontario Milk Marketing Board
Ontario Ministry of Health
Ontario Ministry of Tourism and Recreation
State of Florida, Department of Citrus

Finally thanks are expressed to Marie Hubbs and Em[illegible] Library, for their respective work in the editing a[illegible]

Cover graphics are credited to The National High B[illegible] Institutes of Health, U.S. Department of Health an[illegible]

INTRODUCTION

The Nutrition and Fitness Manual is available separately, or as a part of a related publication entitled: Nutrition and Fitness Kit: A Summary of Research and Resources.

This manual is divided into five sections. The first four sections summarize current knowledge in specific areas and provide extensive popular and professional - level references; the fifth section outlines additional recommended resources.

In order to reinforce the basic concepts of general nutrition, the role of nutrients and the use of Canada's Food Guide are reviewed briefly in the first section. Relationships between nutrition and fitness-related lifestyle factors and health status are summarized in section two. The third section provides an overview of energy balance as it specifically relates to weight control; here diet and exercise are considered. The effects of nutrition on athletic performance are examined in section four. Each section is referenced and supplemented by recommended reading lists. Many of the popular-level references cited will be available in local libraries and bookstores. Professional-level material can be found at most university libraries, or ordered through the publisher. The fifth section provides additional recommended background references. Material is classified by the type of resource: curriculum guides, teaching aids and audiovisuals; periodicals and organizations.

All readings and resources listed in the manual are recommended by the Nutrition Information Service. Sources are listed for all materials except journal articles; publications from American sources are priced in U.S. dollars.

Together, the research summaries, background references and recommended resources provide a comprehensive introduction to the topic of nutrition and fitness.

Comments or questions about this publication are invited. Please contact:

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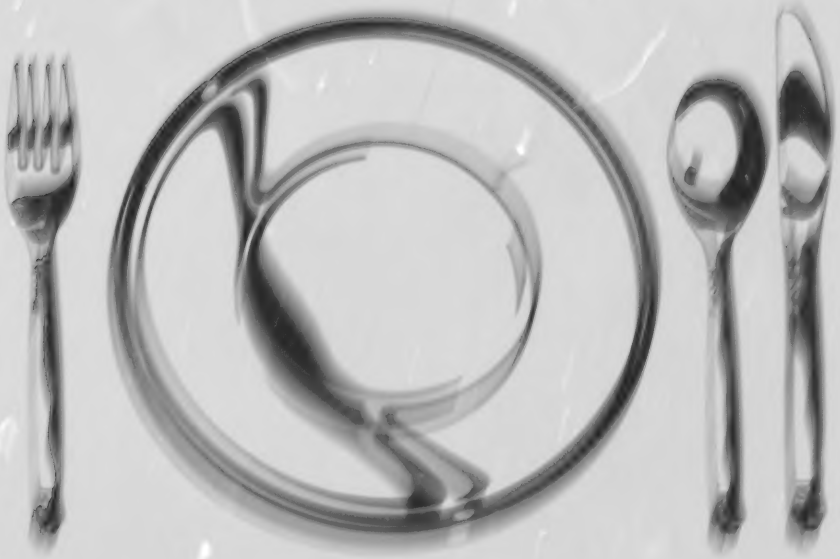
1

GENERAL NUTRITION CONCEPTS



GENERAL NUTRITION CONCEPTS

Most people realize the importance of eating a nutritions diet but what exactly does this entail? Nutrition is the science that deals with the relationships between food and the human body. Although a very complex science, nutrition mainly deals with some very simple concepts that are easy to understand. Over the years, health professionals have developed food guides, recommended daily intakes, nutrient guidelines and standard tables which take much of the mystery out of the study of nutrition.

Proper nutrition involves obtaining the over 50 nutrients required by the body for optimal health. Even the most highly trained specialists have difficulty remembering the exact amounts of each nutrient and in what proportions they are required. Fortunately, Canada's Food Guide takes care of this, for it is an eating plan that supplies all the required nutrients in the correct proportions.

A. CANADA'S FOOD GUIDE - HOW IT WORKS

Canada's Food Guide is a nutrition education tool which contains the types and amounts of food which together provide a sensible nutrition eating pattern, thus contributing to a healthy lifestyle. The guide divides foods into four groups according to the major nutrients they contain and gives the daily amounts required. (See Figure 1).

The following is a brief description of each of the four food groups. For a more detailed discussion, see Canada's Food Guide Handbook, listed at the back of this section.[1]

---

[1] Canada, Department of National Health and Welfare, Canada's Food Guide Handbook, pp. 14-26.

The milk and milk products group is a major source of calcium, riboflavin and one of the few foods which contains vitamin D. This group also provides vitamin A, protein and fat. In skim milk and 2% milk, vitamin A is added under the Food and Drugs Act and Regulations.

Fruits and vegetables are excellent sources of vitamin A and C, often providing the daily requirement for these vitamins. They also supply iron, carbohydrates and fiber.

The breads and cereals group is an important source of carbohydrate, fibre, niacin, thiamin, riboflavin, iron and protein.

Meat, fish, poultry and alternates provide most of our daily protein needs. They are also a major source of iron, niacin, thiamin, riboflavin, vitamin A, vitamin B^{12} and fat.

Following the basic Canada's Food Guide provides 1000-1400 calories per day. The use of 'extra' foods such as sweets, fats and oils, spreads, and beverages will add calories over and above the 1000-1400. These foods are generally low in nutrients and high in calories so are of little benefit in meeting overall daily nutrient needs. However, when used in moderation, they add variety to the diet.

According to the 1983 Recommended Nutrient Intakes for Canadians (RNI), a 20 year-old male with a moderate activity level would require about 2800 calories per day.[2] These additional calories could be obtained by increasing the numer and size of servings from each group and adding a few 'extras'. Compare this to a 20 year-old obese make who is attempting to reduce. He would require about 1400 calories per day to effectively lose about 1-2 pounds per week (for more detail see section three). He would

---

[2]Canada. National Department of Health and Welfare, Recommended Nutrient Intakes for Canadians. p. 14.

Figure 1
Canada's Food Guide

Eat a variety of foods from each group every day

milk and milk products

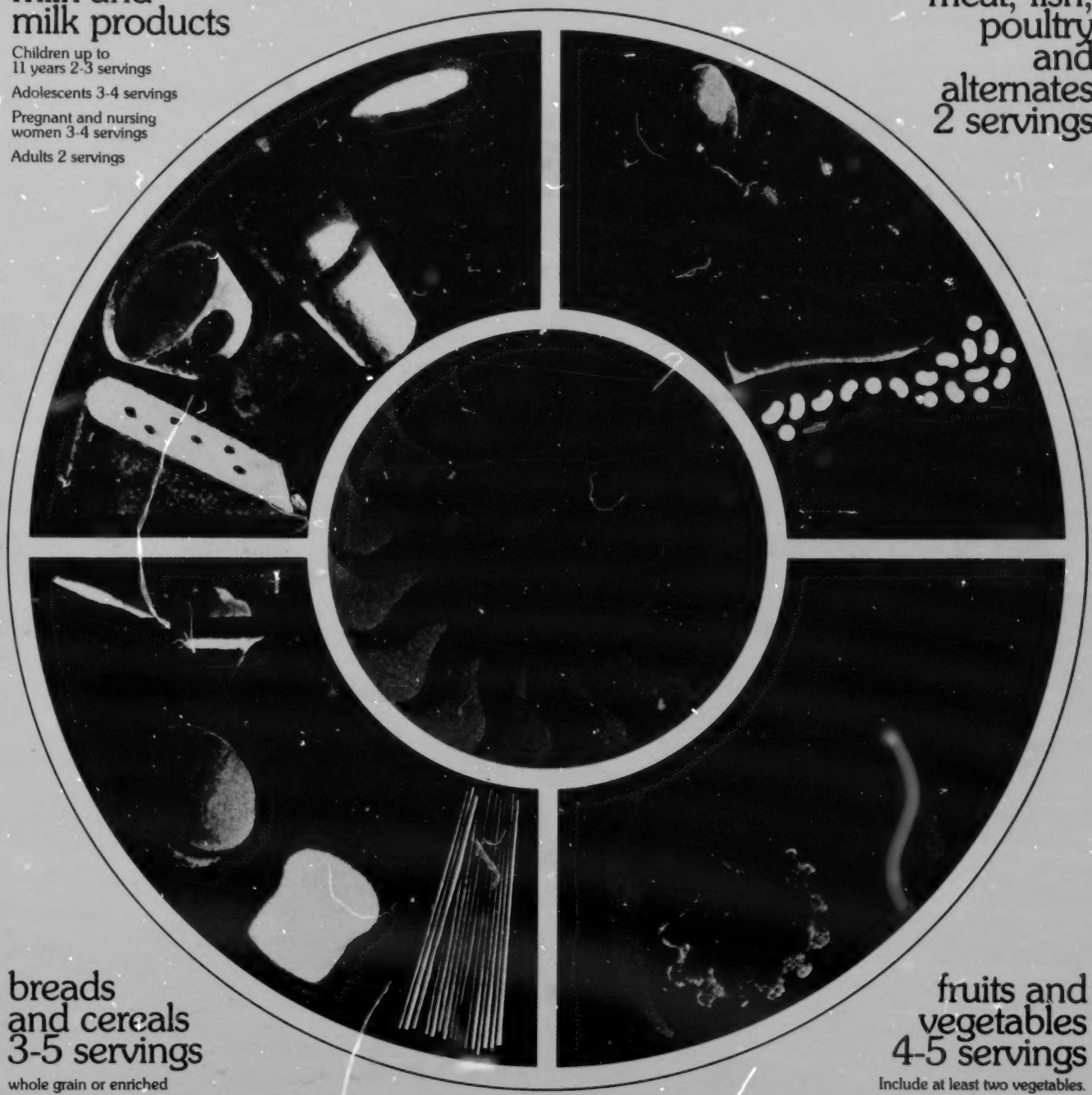
Children up to 11 years 2-3 servings

Adolescents 3-4 servings

Pregnant and nursing women 3-4 servings

Adults 2 servings

meat, fish, poultry and alternates 2 servings



breads and cereals 3-5 servings

whole grain or enriched

fruits and vegetables 4-5 servings

Include at least two vegetables.

Health and Welfare Canada
Santé et Bien-être social Canada

Canada

Variety

Choose different kinds of foods from within each group in appropriate numbers of servings and portion sizes.

Energy Balance

Needs vary with age, sex and activity. Balance energy intake from foods with energy output from physical activity to control weight. Foods selected according to the Guide can supply 4000 – 6000 kJ (kilojoules) (1000 – 1400 kilocalories). For additional energy, increase the number and size of servings from the various food groups and/or add other foods.

Moderation

Select and prepare foods with limited amounts of fat, sugar and salt. If alcohol is consumed, use limited amounts.

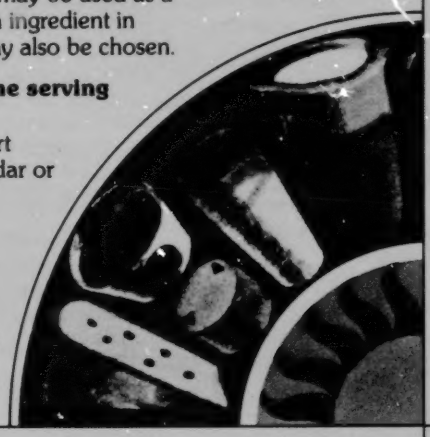
milk and milk products

Children up to 11 years	**2-3 servings**
Adolescents	**3-4 servings**
Pregnant and nursing women	**3-4 servings**
Adults	**2 servings**

Skim, 2%, whole, buttermilk, reconstituted dry or evaporated milk may be used as a beverage or as the main ingredient in other foods. Cheese may also be chosen.

Some examples of one serving
250 mL (1 cup) milk
175 mL (¾ cup) yoghurt
45 g (1½ ounces) cheddar or process cheese

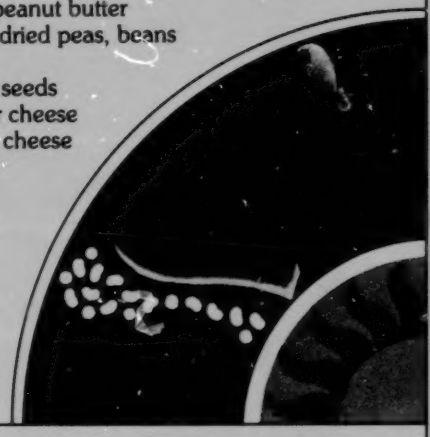
In addition, a supplement of vitamin D is recommended when milk is consumed which does not contain added vitamin D.



meat, fish, poultry and alternates

2 servings

Some examples of one serving
60 to 90 g (2–3 ounces) cooked lean meat, fish, poultry or liver
60 mL (4 tablespoons) peanut butter
250 mL (1 cup) cooked dried peas, beans or lentils
125 mL (½ cup) nuts or seeds
60 g (2 ounces) cheddar cheese
125 mL (½ cup) cottage cheese
2 eggs

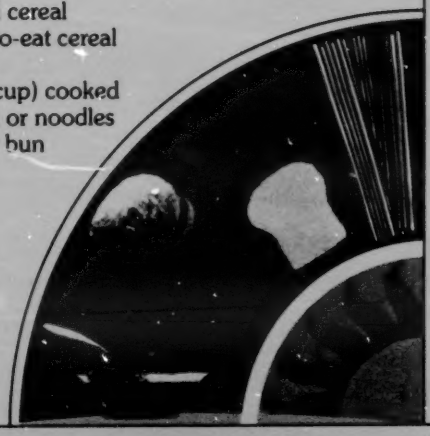


breads and cereals

3-5 servings

whole grain or enriched. Whole grain products are recommended.

Some examples of one serving
1 slice bread
125 mL (½ cup) cooked cereal
175 mL (¾ cup) ready-to-eat cereal
1 roll or muffin
125 to 175 mL (½ – ¾ cup) cooked rice, macaroni, spaghetti or noodles
½ hamburger or wiener bun



fruits and vegetables

4-5 servings

Include at least two vegetables.

Choose a variety of both vegetables and fruits — cooked, raw or their juices. Include yellow, green or green leafy vegetables.

Some examples of one serving
125 mL (½ cup) vegetables or fruits – fresh, frozen or canned
125 mL (½ cup) juice – fresh, frozen or canned
1 medium-sized potato, carrot, tomato, peach, apple, orange or banana

accomplish this by following the basic food guide without any extras. To further illustrate the wide range of caloric requirements: a 20 year old male in training for a marathon could require more than 4000 calories a day to maintain his weight.[3]

Following the eating pattern as set out in Canada's Food Guide will provide 10-20% of the total calories from protein, 50-55% from carbohydrate and 30-35% from fat. This is in accordance with the Nutrition Recommendations for Canadians adopted by Health and Welfare Canada in 1977.[4] The reduction of fat from 40% to 30-35% should be noted. This includes using a high proportion of polyunsaturated fats. Carbohydrate intake should include whole grain products and simple sugars such as sucrose and fructose are to be avoided.

B. THE FUNCTION OF NUTRIENTS

The over 50 nutrients found in food play a role in the maintenance and growth of systems in the human body; some to a larger extent than others. The six main classes of nutrients include: carbohydrates, protein, fat, vitamins, minerals and water.

Carbohydrates: are the principal, most efficient body fuel used by all parts of the body and the only source of energy the brain can use. They have an important fat and protein sparing effect. Carbohydrates will be used for energy and leave protein and fat for their specific functions instead of using them for fuel.

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[3]Marie V. Krause and L. Kathleen Mahan, Food, Nutrition and Diet Therapy. p. 332.

[4]Canada. Department of National Health and Welfare, Nutrition Recommendations for Canadians. (Pamphlet).

Protein: provides for the repair, maintenance and growth of all body tissue. It is also used as an energy source because it can be converted to glucose if required, but this is less efficient.

Fat: is a major source of energy during exercise since the body will use up fat stores if insufficient carbohydrate is available. It is also necessary for carrying fat-soluble vitamins and is an essential component of cell membranes and nerves.

Vitamins: are essential for regulating the body's chemical reactions and for aiding in the metabolism of other nutrients.

Minerals: are required in many complex reactions in the body (eg. Chromium is necessary in order for the body to utilize glucose).

Water: regulates body temperature, insulates and protects body organs, provides a medium for chemical reactions to take place, and transports nutrients.

Fibre: is not considered a nutrient because it is not absorbed by the body, but it is thought to be important. According to Krause and Mahan, it has protective qualities which lessen colonic pressure, reduce the exposure of the gut to carcinogenic substances and help to lower blood cholesterol by acting as a scavenger.[5] Table 1 outlines the major food sources for the six classes of nutrients and some of the major vitamins and minerals.

The recommended readings beginning on page 8 provide reference to further information, ranging from clinical to consumer topics. Professional references are recommended for advanced reading and can be found in most university libraries.

---

[5] Marie V. Krause and L. Kathleen Mahan, Food, Nutrition and Diet Therapy. p. 50.

TABLE 1

Sources of Nutrients in Foods

Nutrient	Food Sources
PROTEIN	meat, eggs, poultry, fish, cheese, legumes, milk
FAT	butter, margarine, lard, vegetable oil, salad dressing, meat, whole milk products, egg yolk, nuts
CARBOHYDRATES	breads, cereals, fruits, syrups, sugars
VITAMINS:	
Vitamin A	liver, kidney, butter and margarine, cream, milk, dark green leafy vegetable, yellow fruits and vegetables
Vitamin C	citrus fruits, raw leafy vegetables, tomatoes, cabbage, potatoes, strawberries, green peppers
Thiamin (B1)	pork, beef, liver, wheat germ, poultry, whole grain and enriched breads and cereals, legumes
Niacin	organ meats, peanuts, beans, peas, whole grain and enriched breads and cereals
Riboflavin (B2)	milk, cheddar and cottage cheese, organ meats, eggs, green leafy vegetables, whole grain and enriched breads and cereals
MINERALS:	
Calcium	milk and milk products, broccoli, kale, sardines, clams, oysters
Iron	liver, red meats, legumes, whole grain and enriched breads and cereals, egg yolk, molasses, dark green vegetables
Zinc	milk, liver, shellfish, bran
FIBRE	bran, whole grain breads and cereals, fruits and vegetables

C. RECOMMENDED READINGS

I. Popular Reading

Barrett, S., and Knight, G. The Health Robbers, 2nd ed., Philadelphia: George F. Stickley Co., 1981. ($12.95) SOURCE: George F. Stickley Co., 210 Washington Square, Philadelphia, Pennsylvania 19106.

Bright-See, Elizabeth and Hope, Jane. Every Woman's Book of Nutrition. Toronto: McGraw-Hill Ryerson, 1982. ($8.95) SOURCE: McGraw-Hill Ryerson Limited, 330 Progress Avenue, Scarborough, Ontario M1P 2Z5.

Broady, Jane. Jane Broady's Nutrition Book. New York: W. W. Norton and Co., 1981. ($17.95) SOURCE: W. W. Norton and Co., Inc., 500 Fifth Avenue, New York, New York 10110.

Broome, C. and MacDonald, D. Newsletters, News Releases, and Journals Related To Food and Nutrition: A Selected List. Toronto, Nutrition Information Service, 1981. ($4.95, $4.00 prepaid) SOURCE: Library Publications Office, Room L284, Ryerson Polytechnical Institute, 50 Gould Street, Toronto, Ontario M5B 1E8.

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Canada. National Department of Health and Welfare. Health Promotion Branch. Canada's Food Guide Handbook. Ottawa: Queen's Printer, 1982. (Free) SOURCE: Information Directorate, Health and Welfare Canada, Ottawa, Ontario K1A 0K9.

Canada. National Department of Health and Welfare. Health Protection Branch. Recommended Nutrient Intakes for Canadians. Revised Edition. Ottawa: Queen's Printer, 1983. ($8.95) SOURCE: Supply and Services Canada, Ottawa, Ontario K1A 0S5

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Center for Science in the Public Interest. Midget Encyclopedia of Food and Nutrition. Washington: D.C., 1977. ($1.00) SOURCE: CSPI Publications, 1755 S. Street, N.W., Washington, D.C. 20009.

Chicago Nutrition Association. Nutrition References and Book Reviews. Chicago: Chicago Nutrition Association, 1981. ($8.00) SOURCE: CNA, 6158 S. Kedzee Avenue, Chicago, Illinois 60652.

Consumer Guide. The Vitamin Book. New York: Simon and Schuster, 1979. ($8.95) SOURCE: Simon and Schuster, Inc., 1230 Avenue of the Americas, New York, New York 10020.

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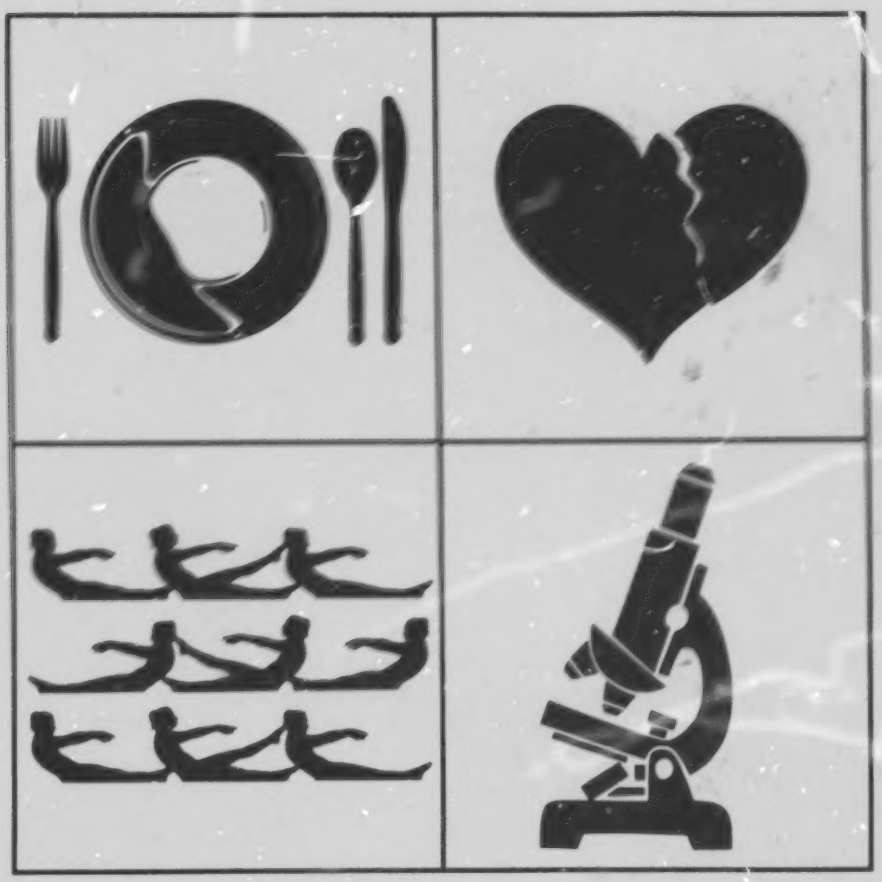
LIFESTYLE— NUTRITION AND FITNESS



LIFESTYLE - NUTRITION AND FITNESS

North Americans enjoy one of the highest standards of living in the world. We also boast one of the best medicare systems along with very mechanized lifestyles.

Lifestyle is a "pattern of living which affects health, and a person can exert control over lifestyle."[6] Lifestyle factors such as diet, level of physical activity, stress and drug use are known risk factors for a myriad of diseases. Cancer, gastrointestinal disease, dental disease, hypertension, obesity and cardiovascular disease have all been linked to dietary intake.[7, 8, 9, 10, 11, 12, 13, 14, 15, 16]

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[6] Canada. Department of National Health and Welfare, Canada's Food Guide Handbook, p. 43.

[7] National Dairy Council, "An update on nutrition, diet and cancer", pp. 25, 27.

[8] N. Lew, "Nutritional implications in cancer.", p. 4.

[9] D. B. Clayson, "Nutrition and cancer: An unresolved problem", p. 1.

[10] D. P. Burkitt, "Economic development - not all bonus.", pp. 6-8.

[11] A. I. Mendeloff, A. M. Connell, and D. Kritchevsky, Nutrition in Disease: Fibre, p. 24.

[12] International Advisory Group on the Relationship Between Diet, Nutrition and Dental Caries, Report to the Nutrition Foundation, pp. 1, 4, 6-7.

[13] G. A. Bray, ed., Obesity in America.

[14] M. Winick, ed., Nutrition and the Killer Diseases.

[15] National Dairy Council, "Dietary factors and blood pressure", p. 25.

[16] J. J. B. Anderson, ed., Optimal Nutrition and Disease Prevention.

Of these, only obesity and cardiovascular heart disease have been linked to both diet and level of physical activity. Obesity has been discussed in the section on weight control and the other diseases mentioned are outside the scope of nutrition and fitness; cardiovascular heart disease is therefore the focus of this section. For further information on lifestyle diseases not covered in this publication, please refer to the references at the end of this section.

Cardiovascular disease is also known as heart disease and coronary heart disease. Essentially, it is caused by atherosclerosis which is the deposition of fat and cholesterol on the inner lining of the arteries of the heart.[17] Subsequent hardening and narrowing of these arteries can lead to heart attacks and strokes. Cardiovascular disease is very serious; approximately 50 per cent of all deaths in Canada are related to atherosclerosis. Moreover, it affects not only the aged in the population.[18]

Cardiovascular disease risk factors such as elevated blood lipids and high blood pressure are influenced by daily diet and physical activity patterns.[19] This is important to note since 25 per cent of individuals suffering heart attacks die before reaching the hospital.[20] Prevention is the key, and may be accomplished through changes in risk factors. Other risk factors include obesity, diabetes, maleness, genetics, stress and cigarette smoking.[21, 22] Some of these risk factors,

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[17] P. Hage, "Diet and exercise programs for coronary heart disease: Better late than never," p. 121.

[18] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 13.

[19] T. J. Coates, R. W. Jeffery and L. A. Slinkard. "Heart health eating and exercise: Introducing and maintaining changes in health behaviors," p. 15.

[20] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 13.

[21] R. E. Olson, "Importance of physical activity and nutrition in health maintenance," in Diet and Exercise: Synergism in Health Maintenance, p. 11.

[22] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 22.

particularily obesity, stress, and cigarette smoking, can be controlled through diet and/or physical activity.

Much research has been done in this area, stemming from studies done in the past three decades which showed that North Americans were physically generally unfit and at higher risk for coronary heart disease due to physical inactivity, diets that were high in calories and saturated fats, and cigarette smoking. Now, according to Pollock and Blair, we are changing our lifestyles and becoming more health conscious.[23] This involves not only an improvement in diet and exercise but an understanding and application of the synergistic effect between the two in such a manner that the chances of coronary heart disease are effectively reduced.

A. DIET AND LIFESTYLE

Perhaps the single most recognized dietary components linked to cardiovascular disease are cholesterol and dietary fat. Cholesterol is the fatty substance which is deposited on the lining of the arteries, undermining their integrity and thereby causing heart attacks and strokes. Many studies have been conducted linking the incidence of coronary heart disease to those people with higher plasma lipids.[24] Moreover, there is a strong correlation between dietary fat and plasma cholesterol levels.[25]

The type of fat consumed also influences plasma cholesterol levels. Foods which are high in saturated fats and cholesterol tend to raise plasma cholesterol levels while those foods high in polyunsaturated fats will lower these levels.[26] Table 2

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[23] M. L. Pollock and S. N. Blain, "Exercise prescription", in Nutrition and Fitness: Intervening in Risk Factor Determination and Disease, p. 32.

[24] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 35.

[25] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 79.

[26] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 79.

lists foods high in saturated fats and polyunsaturated fat alternatives.

Table 2

Foods High in Saturated Fat and Polyunsaturated Alternatives

High in Saturated Fat	High in Polyunsaturated Fat
Beef, pork, lamb, luncheon meats, hot dogs, sausages	Fish, poultry
butter	margarine
whole milk	skim or 2% milk
ice-cream	ice-milk or frozen yoghurt
fried foods	broiled or baked foods

Reduction of dietary cholesterol has not been shown to result in a significant reduction in plasma cholesterol.[27] Moreover, diets that practically eliminate cholesterol are neither practical or palatable. Therefore, a modest decrease in cholesterol intake to no more than 400 mg/day is recommended.[28] This, in combination with a diet lower in overall fat is a better alternative since the absorption of dietary cholesterol depends on the availability of fat.[29] Health and Welfare Canada recognizes this and recommends a reduction in calories from fat to 35% of total calories.[30]

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[27] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 40.

[28] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 40.

[29] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 93.

[30] Canada. Department of National Health and Welfare, Canada's Food Guide Handbook, p. 43.

It is important to note that although a healthy change in eating habits later in life is beneficial; adopting a 'prudent' diet from birth is the best pattern. Studies have shown that 'fatty streaks' start to show up in the aorta by 6 months of age in man.[31] These fatty streaks are potentiators for atherosclerosis if the aforementioned risk factors are present. If, however, a healthy lifestyle is adopted from birth, these fatty streaks could remain unchanged or disappear. A healthy lifestyle includes a diet that follows the guidelines of a prudent diet.[32, 33]

1) Avoid overweight by consuming calories to maintain or reach ideal weight. (See the section on weight control). This is imperative since obese persons have an increased incidence of hypertension, hyperlipidemia and diabetes all of which are all risk factors in coronary heart disease.

2) Consume a nutritionally adequate, balanced diet and a variety of foods based on Canada's Food Guide. (See the general nutrition section).

3) Reduce the consumption of simple carbohydrates such as sugar, honey, jam, cakes, cookies, beverages and increase the consumption of complex carbohydrates such as fresh fruits and vegetables, whole-grained and enriched breads and cereals, potatoes and legumes. This is important since excess simple sugars may cause diabetes and obesity; both major risk factors in cardiovascular disease.

4) Limit the amount of alcohol in the diet. Alcohol provides excess energy and thus can contribute to obesity and diabetes.

5) Limit the total amount of fat in the diet. Reduce saturated fat by replacing some with polyunsaturated fat. (See Table 2).

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[31] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 29.

[32] Canada. Department of National Health and Welfare, Report of the Committee on Diet and Cardiovascular Disease, p. 40.

[33] V. B. Knotts, Nutrition and Fitness: Intervening in Risk Factor Determination and Disease, p. 10.

6) Avoid excess salt by a restriction in the use of salty foods and in the use of salt in cooking and at the table. Excess sodium has been linked to hypertension (high blood pressure) and this is a major risk factor in coronary heart disease. Table 3 lists foods which are high in salt.[34]

7) Increase dietary fiber. Fiber has been shown to act as a cholesterol "scavenger" by carrying it away from potential deposition sites. Fiber is found in bran, whole grains, whole fruits and vegetables, nuts, seeds and legumes.

Table 3

Foods High in Salt

chips	hot dogs
crackers	bacon
dips	sausages
cheese	processed foods
pickles	canned soups and vegetables
olives	sauces
luncheon meats	pizza
commercial bakery products	

B. PHYSICAL ACTIVITY AND LIFESTYLE

There is much evidence linking physical inactivity to an increased risk of coronary heart disease.[35] Unless an individual actively seeks an exercise program, there is little chance that the daily routine offers sufficient physical activity because of mechanization and automation.

Many studies show that exercise is protective against coronary heart disease. Exact mechanisms are not known, but improved heart and lung function and blood flow to the heart play a part. In addition, recent studies have examined the

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[34] V. B. Knotts, p. 10.

[35] S. M. Fox and J. A. Metcalf, "Physical activity and diet in the treatment of coronary heart disease" in Diet and Exercise: Synergism in Health Maintenance, p. 127.

relationship between exercise and blood cholesterol levels.[36] More specifically, Hartung and Squires studied the effect of exercise on HDL-cholesterol.[37] HDL-cholesterol refers to "high density lipoprotein-cholesterol", a particular type of cholesterol which is in fact a 'good guy' because it carries cholesterol to the liver to be processed for excretion. On the other hand, low-density lipoprotein-cholesterol (LDL-cholesterol) carries cholesterol to the various parts of the body to promote plaque formation in arteries. The concern, therefore, is not necessarily for the total amount of cholesterol in the blood, but rather the proportions of HDL and LDL cholesterol. In a controlled study of active middle-aged men versus inactive controls, Hartung and Squires found that regular endurance activities elevate HDL-cholesterol over a prolonged period. Although these findings are strongly suggestive there is as yet no solid proof that the risk of coronary heart disease is decreased.[38] This is likely due to the intervening variables in an individual's lifestyle.

The best types of activities are endurance stimulating activities such as cross country skiing, running and swimming. These activities increase cardiovascular fitness while activities such as weight lifting and calisthenics do not. Together, they promote overall fitness; both cardiovascular and flexibility/strength. (See the physical activity part of the weight control section for more details). According to Pollock and Blair 'overloading' is essential to improving physical fitness. Muscles and the heart will not become stronger or work better unless they

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[36] R. A. Moore, W. A. Penfold, R. D. Simpson, R. W. Simpson, J. L. Mann and R. C. Turner, "High-density lipoprotein, lipid and carbohydrate metabolsim during increasing fitness," p. 76.

[37] G. H. Hartung and W. G. Squires, "Exercise and HLD-cholesterol in middle-aged men," p. 121.

[38] S. M. Fox and J. A. Metcalf, p. 130.

are exercised beyond normal intensity thresholds.[39] Some ground rules for incorporating an exercise program include:[40]

- regularity; a frequency of 5 times a weeks is best, 4 is adequate and 3 times a bare minimum
- a good pair of shoes suited to the chosen activity are a must
- start slowly, working up little by little
- warming up prior to and cooling down after exercising is imperative to avoid injury

Habitual physical activity is beneficial at all ages. It is thought that a child adopting a healthier lifestyle through increased physical activity will have a decreased risk of cardiovascular and related diseases later in life. Moreover, it is believed that teaching school children about the benefits of healthy eating and exercise habits will also help to encourage the adults around them to change as well.[41] In the elderly, regular aerobic exercising has been found to augment aerobic power by 25 per cent and facilitate reduction of body fat and increase in lean tissue. In addition, the customary age-related calcium loss from bones is halted.[42]

Young and middle-aged adults can benefit from exercise particularly where stress is concerned. Although stress is recognized as a risk factor of heart disease, it is one of the hardest to evaluate since the mechanism has not been fully explained.

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[39] M. L. Pollock and S. N. Blair, p. 33.

[40] L. W. Gibbons. "Guidelines for your exercise program" in Nutrition and Fitness: Intervening in Risk Factor Determination and Disease, p. 15.

[41] T. J. Coates, R. W. Jeffery and L. A. Slinkard, p. 15.

[42] R. H. Sidney, R. J. Shephard and J. E. Harrison "Endurance training and body composition of the elderly," p. 331.

Nevertheless, due to the stressful nature of work and urban living, it is important to create an outlet for that stress; exercise provides such an outlet. Increasingly, individuals caught in stressful jobs or other situations are embarking on exercise programs ... whether it be walking to work or joining an executive fitness club ... because by doing so they feel better able to cope with the stress-causing factors in their lives.

C. RECOMMENDED READINGS

I. Popular Reading

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American Dental Association. Diet and Dental Health. Chicago: American Dental Association, 1975. (Single copy free) SOURCE: American Dental Association, 211 East Chicago Ave., Chicago, Illinois 60611.

American Heart Association. Recipes for Fat Controlled, Low Cholesterol Meals. Dallas: American Heart Association, 1975. (Free) SOURCE: Ontario Heart Foundation, 576 Church Street, Toronto, Ontario M4Y 2S1.

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Antell, S. Backpacker's Recipe Book. Boulder: Pruett Publishing, 1980. ($4.95) SOURCE: Pruett Publishing Co., 2928 Pearl St., Suite 711, San Francisco, California 94104

Astrand, P. O. Health and Fitness. Woodbury, New York: Barron's Educational Series, Inc., 1977. ($4.95) SOURCE: Barron's Educational Series, Inc., 113 Crossways Park Drive, Woodbury, New York 11797.

Best Foods. CPC International. The Fitness Connection. Englewood Cliffs, New Jersey: CPC International, 1980. (Free) SOURCE: Best Foods Nutrition Information Service, Box 307, Coventry, Connecticut 06238.

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Brunswick, J., Love, D. and Weinberg, A. How to Live 365 Days a Year the Salt-Free Way. Plaines, Illinois: Bantam Books, Inc., 1977. ($1.95) SOURCE: Bantam Books, 414 E. Golf Rd., Des Plaines, Illinois 60016.

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Burkitt, D. Eat Right-To Stay Healthy and Enjoy Life More. New York: Arco Publishing Co., 1979. ($5.95) SOURCE: Arco Publishing Co., 219 Park Ave., S., New York, New York 10003.

California Raisin Advisory Board and The President's Council of Physical Fitness and Sports. Take the Time - A Guide to Fitness for the Working Woman. Fresno, California: The California Raisin Advisory Board, P.O. Box 5335, Fresno, California 93755.

Campbell Soup Company. Your Sodium Intake: Some Basic Steps in the Right Direction. Camden, New Jersey: Campbell Soup Co., 1983. (Free) SOURCE: Campbell Soup Co., Consumer Nutrition Center, Campbell Place, Camden, New Jersey 08101.

Canada. National Department of Health and Welfare. Health Promotion Branch. Canada's Food Guide Handbook. Ottawa: Queen's Printer, 1982. (Free) SOURCE: Information Directorate, Health and Welfare Canada, Ottawa, Ontario K1A 0K9.

Canadian Dental Association. Eating Properly for Better Dental Health. Ottawa: Canadian Dental Association, 1979. ($0.15) SOURCE: Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6.

Cavaini, M. The High Fiber Cookbook. Chicago: Henry Regnery Co., 1977. ($6.95) SOURCE: Contemporary Books, 190 North Michigan Ave., Chicago, Illinois 60601.

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Food Marketing Institute. Sodium Sense. Washington: Food Marketing Institute, 198? (Single copy free) SOURCE: Food Marketing Institute, 1750 K Street, N. W., Washington, DC 20006.

Franz, C. and Havens, L. The On and Off the Road Cookbook. Santa Fe: John Muir Publications, 1982. ($8.50) SOURCE: John Muir Publications, Inc., P.O. Box 613, Santa Fe, New Mexico 87501.

General Mills, Inc. Food for Fitness. Minneapolis: General Mills, Inc., (1979?). ($0.35) SOURCE: Nutrition Department, General Mills, Inc., Department 45, P.O. Box 1112, Minneapolis, Minnesota 55440.

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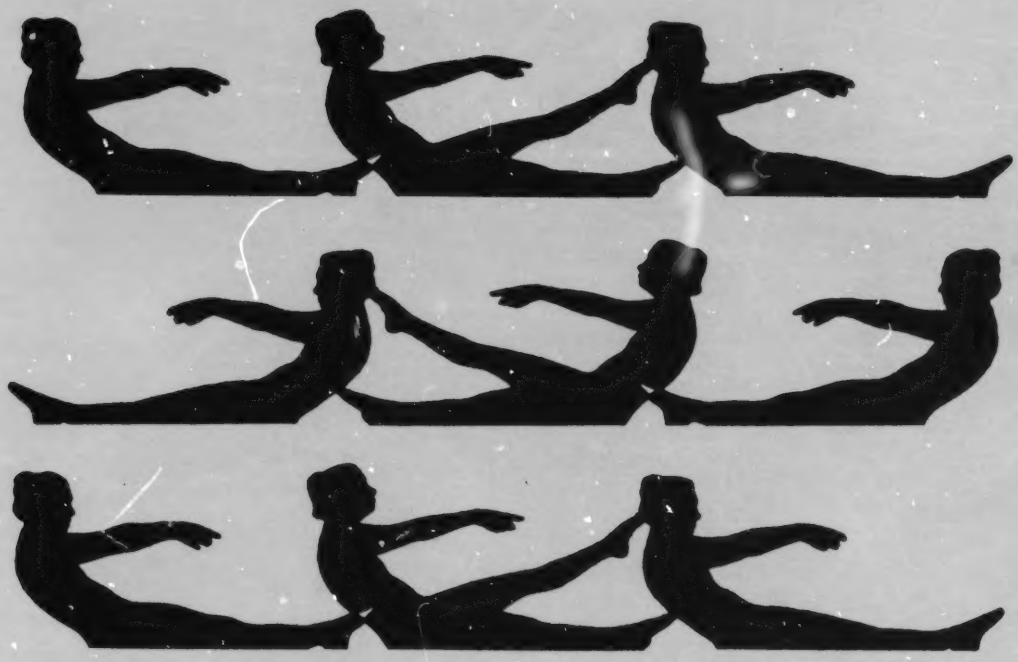
3

WEIGHT CONTROL— DIET AND EXERCISE



WEIGHT CONTROL - DIET AND EXERCISE

Today, in developed countries, people enjoy relatively affluent lifestyles primarily characterized by mechanization and an overabundance of food. An unfortunate consequence of this affluence is the high prevalence of obesity. Although there are many different interpretations of the term obese, according to Krause and Mahan, a generally accepted definition is that obese is a deviation of 20 percent or more above the desirable weight.[38] An individual with a weight of 10 percent above normal, is considered overweight.

A. WHAT IS NORMAL WEIGHT?

The quickest and easiest method of determining normal or ideal weight is the use of height/weight charts. Although these are not entirely accurate because they do not account for very different bone structures nor for people weighing more but are muscular (such is the case with many athletes), they are a useful general guide. Tables 4 & 5 are the recently revised charts published by Metropolitan Life Insurance Company.

Another very simple way to determine ideal body weight is by using the following rule of thumb:

> for women - 100 lbs for 5 feet and add 5 lbs for every inch. Add an additional 10% for large frame; subtract 10% for small frame.
>
> for men - 110 lbs for 5 feet add 5 lbs per inch. Add 10% for large frame; subtract 10% for small frame.

According to the 1972 Nutrition Canada Survey, approximately 50 percent of Canadian adults are overweight.[39] This is of significant concern since there are many

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[38] Marie V. Krause and L. Kathleen Mahan, Food, Nutrition and Diet Therapy. p. 556.

[39] Canada. Department of National Health and Welfare, Nutrition Canada - National Survey. p. 76.

Table 4

Height and Weight Table for Men

Weight in Kilograms and Pounds According to Frame
in indoor clothing weighing 5 lbs., shoes with 1" heel

Height			Small Frame		Medium Frame		Large Frame	
feet	inches	cm.	lbs.	kg.	lbs.	kg.	lbs.	kg.
5'	2"	158	128-134	58.3-61.0	131-141	59.6-64.2	138-150	62.8-68.3
5'	3"	160	130-136	59.0-61.7	133-143	60.3-64.9	140-153	63.5-69.4
5'	4"	162	132-138	59.7-62.4	135-145	61.0-65.6	142-156	64.2-70.5
5'	5"	165	134-140	60.8-63.5	137-148	62.1-67.0	144-160	65.3-72.5
5'	6"	168	136-142	61.8-64.6	139-151	63.2-68.7	146-164	66.4-74.7
5'	7"	171	138-145	62.9-66.2	142-154	64.8-70.3	149-168	68.0-76.8
5'	8"	173	140-148	63.6-67.3	145-157	65.9-71.4	152-172	69.1-78.2
5'	9"	175	142-151	64.3-68.3	148-160	66.9-72.4	155-176	70.1-79.6
5'	10"	178	144-154	65.4-70.0	151-163	68.6-74.00	158-180	71.8-81.8
5'	11"	180	146-157	66.1-71.0	154-166	69.7-75.1	161-184	72.8-83.3
6'	0"	183	149-160	67.7-72.7	157-170	71.3-77.2	164-188	74.5-85.4
6'	1"	185	152-164	68.7-74.1	160-174	72.4-78.6	168-192	75.9-86.8
6'	2"	188	155-168	70.3-76.2	164-178	74.4-80.7	172-197	78.0-89.4
6'	3"	190	150-172	71.4-77.6	167-182	75.4-82.2	176-202	79.4-91.2
6'	4"	193	162-176	73.5-79.8	171-187	77.6-84.8	181-207	82.1-93.9

Source: Metropolitan Life Insurance Company. 1983 Metropolitan Height and Weight Table for Men.

Table 5

Height and Weight Table for Women

Weight in Kilograms and Pounds According to Frame
in indoor clothing weighing 5 lbs., shoes with 1" heels

Height			Small Frame		Medium Frame		Large Frame	
feet	inches	cm.	lbs.	kg.	lbs.	kg.	lbs.	kg.
4'	10"	148	102-111	46.4-50.6	109-121	49.6-55.1	118-131	53.7-59.8
4'	11"	150	103-113	46.7-51.3	111-123	50.3-55.9	120-134	54.4-60.9
5'	0"	152	104-115	47.1-52.1	113-126	51.1-57.0	122-137	55.2-61.9
5'	1"	155	106-118	48.1-53.6	115-129	52.2-58.6	125-140	56.8-63.6
5'	2"	157	108-121	48.8-54.6	118-132	53.2-59.6	128-143	57.8-64.6
5'	3"	160	111-124	50.3-56.2	121-135	54.9-61.2	131-147	59.4-66.7
5'	4"	162	114-127	51.4-57.3	124-138	55.9-62.3	134-151	60.5-68.1
5'	5"	165	117-130	53.0-58.9	127-141	57.5-63.9	137-155	62.0-70.2
5'	6"	168	120-133	54.6-60.5	130-144	59.2-65.5	140-159	63.7-72.4
5'	7"	170	123-136	55.7-61.6	133-147	60.2-66.6	143-163	64.8-73.8
5'	8"	173	126-139	57.3-63.2	136-150	61.8-68.2	146-167	66.4-75.9
5'	9"	175	129-142	58.3-64.2	139-153	62.8-69.2	149-170	67.4-76.9
5'	10"	178	132-145	60.0-65.9	142-156	64.5-70.9	152-173	69.0-78.6
5'	11"	180	135-148	61.0-66.9	145-159	65.6-71.9	155-176	70.1-79.6
5'	0"	182	138-151	62.1-68.0	148-162	66.6-73.0	158-179	71.2-80.7

Source: Metropolitan Life Insurance Company, 1983 Metropolitan Height and Weight Table for Women.

diseases which are directly linked to being overweight. These include gall bladder disease, diabetes, heart disease, hypertension and emotional problems.[30] However, the causes of becoming overweight are not as easily identifiable. An energy imbalance is one factor that has positively been identified as contributing to excessive weight gain. This section of the manual will discuss overweight as a problem of energy imbalance since such factors as genetics, psychology and cultural influences, while recognized as significant, are beyond the scope of this publication.

B. ENERGY BALANCE

The term "energy balance" refers to the energy expended by the body (in basic bodily fuctions and daily activities) equalling the energy consumed (in calories as a measure of food energy). Energy balance results in a maintenance of body weight. An energy expenditure exceeding energy input results in a loss of weight and conversely an energy input greater than energy expended will cause a gain of weight. The following figure summarizes the three possible states of weight status:

Energy input = Energy output = no change
Energy input > Energy output = weight gain
Energy input < Energy output = weight loss

C. ENERGY REQUIREMENTS

Energy is required for all bodily processes such as respiration, digestion, circulation, movement and elimination. The amount of energy required to maintain these bodily functions is known as the basal metabolic rate (BMR). For individuals of average height and weight the basal metabolic energy requirement is 1 calorie (4.184 joules) per hour, per kilogram of body weight.[31] For example, a young

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[30] M. Nash, Weight Control Book. p. 5.

[31] M.V. Krause and L.K. Mahan. pg. 27.

female adult whose ideal body weight is 58 kilograms would require 58 x 1 x 24 = 1392 calories to sustain the bodily processes daily. To adjust for daily physical activity:[32]

sedentary person	-	add 30% additional calories above BMR
lightly active person	-	add 50% additional calories above BMR
moderately active person	-	add 75% additional calories above BMR
very active person	-	add 100% additional calories above BMR

In the above example, the young female adult would require approximately 2000 calories if she did office work with little extra activity. On the other hand, her energy requirements would be above 2800 calories a day if she were a very active person.

Regardless of whether an individual is very active or inactive, in order to lose weight they must have a caloric deficit. This can be accomplished by:

1) reducing energy intake by cutting down on the food intake
2) increasing energy expenditure by becoming more physically active
3) a combination of 1 and 2

To lose one pound, a deficit of 3500 calories must be achieved. For example, a young woman who is overweight and requires 2000 calories per day to maintain this weight would have to take 3500 ÷ 7 or 500 calories a day off her food intake or increase her energy expenditure by 500 calories per day in order to lose one pound per week. It should be noted that 1-2 pounds per week is a safe amount to attempt to lose - more than this might result in too low a caloric intake and subsequent nutrition problems. Moreover, the slower the weight loss is, the more likely it is to stay off. This is essential since the objective of weight control is to reach a desired weight and to remain at that weight.

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[32] M.V. Krause and L.K. Mahan, pg. 29.

This goal is most often not achieved through fad diets. Because fad diets involve such an acute change in eating habits, weight is often quickly lost and put back on as soon as the individual reverts back to their usual way of eating. Furthermore, fad diets rarely include exercise in their program. In fact, these diets are so low in calories and carbohydrates (the body's best source of energy) that the person on the diet is too listless to exercise effectively.

The best and most sensible approach to weight loss is not to treat it as a "stop gap" measure but to instigate a lifelong commitment that involves a change in eating habits and exercise. By increasing physical activity even moderately and by reducing food intake by the equivalent of a small piece of cake daily, chances of success in weight loss and maintenance are far greater than by either method alone. Reducing the amount of food eaten without increasing physical activity represents a deprivation which easily leads to discouragement. Similarily, attempting to lose weight by increasing physical activity alone requires tremendous effort and makes difficult time demands on the individual. A daily combination of about an extra one-half hour of brisk physical activity and a decreased caloric intake of about 300 calories is the most effective weight loss method.

D. ENERGY OUTPUT - PHYSICAL ACTIVITY

Table 6 shows the caloric content of some common foods and the time required to utilize the calories for walking, bicycling, swimming, running and reclining. In addition to the calorie-burning properties of exercise, there are many other benefits:

- dulls the appetite
- results in greater lean body mass and less body fat

Table 6

Caloric Content of Some Common Foods and Activity Time Required to Utilize Them (in minutes)

	Calories	Walking	Bicycling	Swimming	Running
Fruits and Vegetables					
Apple, 1 av.	76	15	9	7	4
Banana, 1 med.	89	17	11	8	5
Beans, green 1 cup	38	8	5	4	3
Carrots, ½ cup	45	9	5	4	2
Orange Juice, ½ cup	55	10	6	5	3
Peas, ½ cup	88	17	11	8	5
Potato, baked 1 med.	105	20	13	9	5
Tomato 1 med.	21	4	3	2	1
Watermelon, ½ slice	22	4	3	2	1
Milk and Milk Products					
Cheese, Cheddar 1 oz.	116	22	14	10	6
Cheese, Cottage ½ cup	120	23	15	11	6
Cream, Sour 1 Tbsp.	25	5	3	2	1
Ice Cream, ½ cup	132	25	16	12	7
Milk, Whole 1 cup	153	29	19	14	8
Milk, Skim 1 cup	84	16	10	8	4
Milk Shake, 10oz.	300	58	37	27	15
Yoghurt, Plain 1 cup	123	24	15	11	6
Yoghurt, Flavored 1 cup	183	35	22	16	9
Meat and Meat Alternates					
Bacon, 2 strips	116	22	14	10	6
Beef, ground 4 oz.	326	63	40	29	17
Beef, roast 4 oz.	253	49	31	23	13
Chicken, roasted 4 oz.	230	44	28	21	12
Chicken, fried 4 oz.	325	67	41	30	17
Eggs, boiled 1 med.	72	14	9	6	4
Eggs, fried 1 med.	110	21	13	10	6
Fish, (eg. Cod) 4 oz.	85	16	10	8	4
Fish, Tuna, canned 4 oz.	223	43	27	20	11
Peanut Butter, 1 Tbsp.	95	18	12	9	5
Breads and Cereals					
Bram, 100% 1 cup	150	29	18	13	8
Bread, White 1 sl.	80	15	10	7	4
Bread, Whole Wheat 1 sl.	72	14	9	6	4
Corn Flakes, 1 cup	80	15	10	7	4
Muffin, bran	86	17	10	8	4
Rice, White-½ cup	105	20	13	9	5
"Extras"					
Candy Bar, average	270	52	33	24	12
Chocolate Chip Cookies, 2	100	19	12	9	5
Honey, 1 Tbsp.	62	12	18	6	3
Sugar, White-1 Tsp.	23	4	3	2	1
Combination and Snack-Type Foods					
French Fries, 10	156	30	19	14	8
Hamburger	344	66	42	31	18
Hot Dog	290	56	35	26	15
Potato Chips, 10	114	22	14	10	6
Soft Drinks, 10 oz.	105	20	13	9	5

Source: Canadian Heart Foundation, The Fitness Wheel, 1975.

- provides the body with more energy to cope with other activities
- improves strength, muscular endurance and flexibility
- prevents the onset of cardiovascular disease and atherosclerosis
- lowers pulse rate; making the heart stronger and the cardiovascular system more efficient
- facilitates quicker recovery after hard work
- acts as an outlet for anxieties, thus reducing the general level of stress
- results in resistance to fatigue
- improves physical appearance
- improves psychological outlook

Incorporating exercise into a daily routine need not involve joining an expensive health spa. However, the exercise should be done consistently and for a long enough period of time to be effective (about 20 min. of cardiovascular exercising). This might involve walking to work - brisk walking is said to be just as effective as jogging. Other ways to incorporate walking: get off the bus a few stops earlier and walk; walk short distances that are usually driven and walk up and down stairs. It is important to note that in order to be effective, the exercise has to have the following characteristics:[33]

- be of low intensity (70% $\dot{V}O_2$ maximum, see below)
- involve large muscle groups
- low skill requirements
- a rhythmic and continuous nature
- in excess of ten minutes duration

The heart pulse rate should get up to about 65-70% of the maximum aerobic

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[33] K. E. Ragg, "Exercise: A misused factor in weight control". p. 461.

oxygen-VO_2 capacity - the maximum being 220 beats per minute minus the age of the individual. Therefore, a thirty year old should engage in activity that will raise heart rate to 70% of 190 or about 135 beats/min. If this is done, then the person will become more physically fit and the resting heart pulse rate will decrease, making the heart stronger and more efficient. Activities that conform to the above characteristics include brisk walking, jogging, cycling, swimming and skating. Table 7 gives the approximate energy cost of some common sports and exercises.

The reasons why some people find exercising ineffective are important to note. First of all, the wrong type of exercise is often chosen.[34] Activities such as handball, volleyball and basketball contain too large an anaerobic component(i.e., are of high intensity, with energy obtained in the absence of oxygen) and must be performed for a long period to be effective. However, these activities, in addition to other daily exercise, add variety and serve to increase muscular strength and coordination. People who are embarking on a fitness program are often in poor physical condition and it is therefore difficult for them to sustain the activity for a long enough time to burn off sufficient calories. Because they are enthusiastic but not in shape, they will exercise vigorously at first and be too stiff and sore the next day to continue. Overweight people become easily frustrated and discouraged with exercise programs. Therefore, exercise alone is usually not a good weight reduction mode. When used in combination with caloric restriction, the intensity and duration of exercise does not have to be as great to result in the desired effects.

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34 K. E. Ragg, "Exercise: A misused factor in weight control", p. 461.

Table 7

Energy Expenditures of Some Common Activities

Activity	Calories/Minute/150 lb person
Basketball	9.4
Cross Country Skiing	9.7
Cycling (9.4 mph.)	6.8
(racing)	11.5
Dancing	7.0
Football	9.0
Golf	5.8
Gymnastics	4.5
Running (6 min per mile)	17.3
(9 min per mile)	13.1
Skating	11.5
Squash	14.4
Swimming (slow crawl)	8.7
Tennis	7.4
Walking	5.6

Source: William D. McArdle, Krank I. Katch and Victor L. Katch, Exercise Physiology, pp. 486-493.

E. ENERGY INPUT - DIET

Decreasing food intake is an imperative component in the weight loss strategy. As previously mentioned, a combination of decreased food intake and increased physical activity will result in the most effective weight loss and subsequent maintenance. This discussion is intended to act as a guideline for a nutritionally safe and sound approach to the diet part of the weight loss strategy.

Fad diets, or crash diets as they are called, are often unappetizing, monotonous, expensive, nutritionally inadequate and hazardous if continued for prolonged periods of time. Their appeal lies in promises of quick weight loss. Many of them are cleverly marketed and play on the potential customer's unsuccessful past attempts at weight loss. Millions of dollars are spent (and made) on the sales of diet books and special "magic" products manufactured to help lose weight.

Although specific fad diets will not be analyzed for here for sake of brevity, and because there are constantly new diets being marketed, there are certain trends and characteristics that can be applied to fad diets in general. These diets often concentrate on one food: the grapefruit diet, the prune diet and the egg diet are dangerous because they exclude all other foods and so are nutritionally inadequate as well as very monotonous! Little better are the high-protein, low-carbohydrate or high-fat diets. These diets include a wider variety of foods but most often exclude one or more entire food groups. Most fad diets are similar in that they may result in weight loss, but that most often the weight loss is not maintained. This is due to - as the name implies - their faddish nature. They are often so "far out" that an individual's eating patterns are changed so drastically that the diet cannot be sustained. More importantly though, essential nutrients are not included. In coming upon any diet in a book or magazine, compare it to Canada's Food Guide to see whether or not it includes foods from all the four food groups.

It is important to realize that an individual attempting to lose weight requires the same nutrients as persons not trying to lose weight. The key though, is to obtain all the necessary nutrients while consuming fewer calories. Foods which have a "high nutrient density" per calorie have to be chosen over foods which are high in calories but contain few nutrients ("empty calorie" foods).

The best way to ensure that this is accomplished is to choose low-calorie alternatives from each of the four food groups in Canada's Food Guide. The same number of servings should be consumed. In so doing, a wide variety of foods are eaten but at a lower energy cost. Furthermore, moderation is stressed and this means cutting down, not cutting out, various foods which add variety to the daily diet.

Table 8 compares high and low calorie choices within each food group.

As mentioned previously "extra" foods which are high in calories but low in nutrients add variety to the diet when used in moderation. For weight loss purposes low calorie alternatives are substituted for common "extra" foods. Table 9 illustrates some of these alternatives.

The goal in weight loss is to lose weight permanently. Often this involves more than just incorporating lower calorie food choices. The following suggestions help to maximize results and long term benefits from dieting.[35]

Eating Habits

1. Eat 3 meals a day, at relatively consistent time. (DO NOT SKIP MEALS)
2. Eat slowly - spend 20 minutes per meal to feel "full".
3. Eat all food (meals and snacks) in one specific place at home (e.g., the kitchen table). This prevents unconscious "extra" eating in various rooms - at the stove or counter, etc.
4. Eat sitting down only.
5. Eat as a singular activity (do not associate eating with reading, watching T.V., etc.).
6. Enjoy eating - chew and taste each bite thoroughly.
7. Keep all foods stored out of sight. Make problematic foods unavailable or inconvenient. Keep low-calorie foods convenient (i.e. in front of refrigerator, keep a supply of cleaned, raw vegetables, diet drinks, etc.).
8. Plan daily meals in advance. Plan eating strategies for parties, weekends, holidays, etc.

Table 8

A Comparison of High and Low Calorie Choices in Each Food Group

Food Group	High Calorie Choice	Calories	Low-Calorie Choice	Calories
Milk & Milk Products	1 cup whole milk	157	1 cup 2% milk or 1 cup skim milk	129 89
	½ cup fruit flavored yoghurt	128	½ cup plain yoghurt	85
	1½ ounces cheddar cheese	151	1½ ounces skim milk, mozzarella cheese	100
Breads and Cereals	1 doughnut	151	1 whole-wheat muffin	104
Fruits and Vegetables	½ cup canned peaches in heavy syrup	78	½ cup water packaged canned peaches	31
			1 raw peach	38
	2½ ounces french fries	220	1 med. baked potato	95
Meat and Alternates	2 ounces beef or pork	150	2 ounces chicken or fish	65

Table 9

Low-Calorie Substitutes for Some Typical "Extra" Foods

Common Extra Foods	Nutritious Low-Calorie Alternatives
Sour cream or cream sauce	Plain yogurt
Butter or Hollandaise sauce on vegetables	Lemon juice or herbs on vegetables
Mayonnaise or oil dressing	Buttermilk or tomato juice dressing
Gravy	Meat broth or juices with fat removed
Deep fat fried batters for meat, fish, poultry	Oven baked breadings for meat, fish, poultry
Butter or margarine on bread or toast	Cheese spread, liver pate, peanut butter can be used without first buttering the bread
Yogurt with sweetened fruit	Unsweetened, undiluted frozen orange juice as yogurt topping. Fresh, unsweetened fruit
Sugar glaze for baked ham, squash or sweet potatoes	Fruit glaze for baked ham, squash or sweet potatoes
Sugar on cereal	Fruit on cereal
Syrup on pancakes	Fruit or yogurt on pancakes

Source: Canada. Department of National Health and Welfare, Health Promotion Branch, Canada's Food Guide Handbook, p. 34.

9. Avoid places (certain restaurants, etc.) where you tend to over-eat.
10. Serve food from the stove. Avoid food containers on table.

Food Selection

1. Eat more raw vegetables and fruits.
2. Eat smaller meat portions...4 - 8 oz./day TOTAL.
3. Eat lean meats, particularly chicken, fish, and veal.
4. Avoid fried foods, fast foods and snacks, cream sauces and gravies, rich desserts, cokes, candy, jam, honey, excess margarine or butter.
5. Practice portion control, choosing small-to-moderate portions. Avoid second helpings.
6. Choose "crunchy" foods (i.e. apple) over "soft" foods (i.e. banana) for greater satisfaction.
7. Select "free foods", water, diet drinks as snacks. Other low-calorie snacks are: raw vegetables and fruit, unbuttered popcorn, broth.

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[35]Georgia G. Kostas, M.P.H., R.d. "Tips for successful weight reduction," In Nutrition and Fitness: Part II-Intervening in Risk Factor Determination and Disease, p. 11. Reprinted by permission from The Student Guide, Nutrition and Fitness: Part II-Intervening in Risk Factor Determination and Disease, Videocassette Series VCS - 9, 1982.

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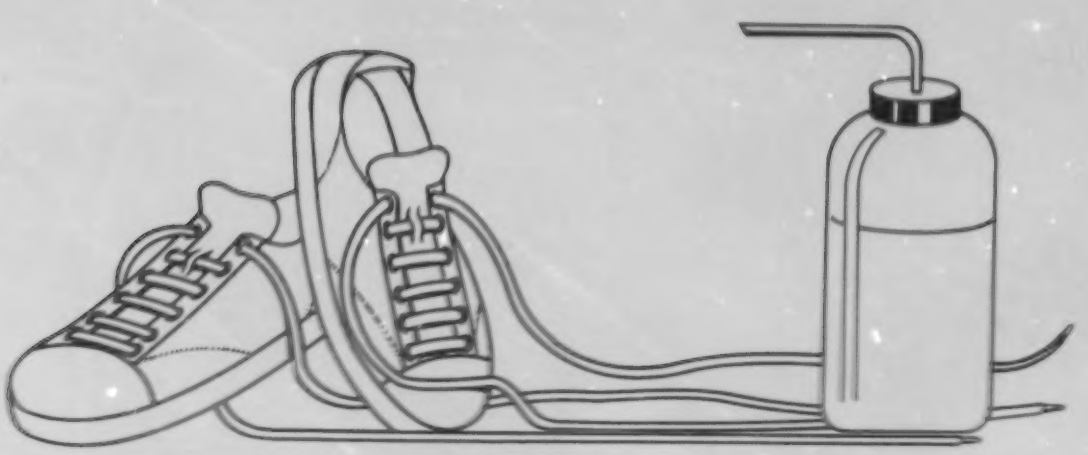
ATHLETIC PERFORMANCE— NUTRITIONAL ASPECTS



ATHLETIC PERFORMANCE - NUTRITIONAL ASPECTS

In general, the nutritional requirements of athletes are similar to those of any other healthy adult. Current literature is consistent in pointing out that an athlete - from a gymnast to a marathoner - needs a normal, balanced diet. This involves eating a diet based on the four food groups. (See the section on general nutrition concepts for more information.) In most cases, the only special considerations in an athlete's diet are an increased energy need and water intake. The abundance of performance-enhancing aids on the market and the many misconceptions held by both coaches and athletes lead to the belief that anything but a simple, balanced diet will make them win. In understanding the athlete's desire to win at all costs, it is no wonder that they will choose an expensive, glossy product to improve performance rather than something that can be obtained from the refrigerator. With all these products on the market and misleading information bombarding the athlete, it is felt that an up-to-date, reliable guide was necessary. This section is therefore intended to concisely outline topics of special nutritional concern to the athlete.

Canada's Food Guide (see Figure 1) is a simplified eating plan that enables a person to obtain the over 50 nutrients the body requires daily for health. This guide divides food into four groups - milk and milk products, breads and cereals, fruits and vegetables and meat and meat alternatives - based on the nutrients they supply. Following the eating pattern as set out in the guide will provide 10-20% of calories from protein, 50-55% from carbohydrate and 30-35% from fat, and 1000-1400 calories. The use of 'extra' foods such as sweets, fats, and spreads will add calories over and above the 1000-1400. If more calories are still required to meet the increased energy needs of some athletes, the number of servings from each food group should be

increased in the right proportions.

The six main classes of nutrients include carbohydrates, protein, fat, vitamins, minerals and water. Each nutrient has specific functions and a brief description of the importance of each class is given in the first section of this manual.

Unfortunately, misinterpretation of the function of these nutrients is common among athletes and coaches and in an atmosphere of competition they are the prime targets for nutritional misinformation. Following is a brief discussion of some of the more prevalent myths.

Prescribing megadoses of vitamins, high-protein diets, individual fad diets and starvation and semi-starvation diets is still common.[36] Buskirk, maintains that the virtues of diets based on such substances as royal jelly, protein powders, yeast, wheat germ oil, or vitamins are not grounded in nutritional research "nor are they likely to be."[37] In fact many of these practices can be harmful and costly. These ergogenic aids, as they are referred to, are taken because there is tremendous pressure on coaches and athletes to win at all costs. Many athletes tend to believe in anything that they think will enhance their performance and become targets for and industry which generates tremendous profits on unproven products.

A study done on nutritional practises of coaches indicates that there is a definite need for more sound, accurate nutrition information.[38] The fact that coaches are recognizing this need is a step in the right direction.

A. THE PROTEIN MYTH

Some of the common myths held by coaches and athletes are slowly being dissipated.

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[36] A. Bentivegna, E.J. Kelly and A. Kalenak, "Diet, fitness, and athletic performance," p. 99.

[37] E.R. Buskirk, "Diet and athletic performance," p. 229.

[38] E.M.B. Wolf, J. [illegible]. Wirth and T.G. Lohman, "Nutritional practices of coaches in the Big Ten," p. 124.

Still, the most prevalent is the protein myth. The popularity of this myth persists due to the fact that protein is essential for building body tissue and hence muscle. It is assumed that eating vast quantities of protein will increase muscular size and strength. In this case, more is not better. Darden explains that over 70 per cent of muscle is water so very little protein is needed for muscular growth.[39] However, Buskirk says that an exception is young, developing athletes, but even in this case the amount of protein in the average North American diet is more than adequate.[40] Excess protein can be very harmful, causing dehydration and putting an extra heavy work load on the kidneys. There is also evidence that the overconsumption of protein contributes to osteoporosis (weak and brittle bones), since protein depletes calcium.

Athletes have also traditionally thought of protein as an energy food. However, the energy required for activity comes from body fat and glycogen (the storage form of carbohydrates). Protein requirements do not increase with exercise and as previously mentioned excess protein can be detrimental to performance. These effects are excacerbated in endurance athletes, especially runners. As an energy source, protein is very inefficient and will only be used as a "last resort" if there is not enough carbohydrate for fat to meet energy needs.

B. THE SUGAR MYTH

The myth still prevails that for a quick energy boost, athletes should eat a chocolate bar or other sweet food. It is true that sugar (glucose) is found in these foods and that glucose is the body's primary source of energy. These foods are simple carbohydrates and although they will give a quick energy boost by raising

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[39] E. Darden, "The nutrition of Olympic athletes," p. 41.

[40] E.R. Buskirk, p. 231.

blood sugar levels they contain pure glucose which causes an insulin rush. This in turn causes blood sugar levels to fall back down almost as quickly as they have risen. Therefore, with less blood glucose, the muscles are forced to use valuable glycogen stores. In addition, sweet foods tend to draw fluids from the body's cells into the gastrointestinal tract to dilute the sugar concentration, causing the athlete to become dehydrated. A better choice, therefore, would be a piece of fruit such as an orange which contains a high proportion of fructose (fruit sugar) which does not require insulin and so will help keep the blood sugar levels constant, thereby not using up valuable glycogen stores. Moreover, fruit provides valuable vitamins and minerals as well. Other good choices are complex carbohydrates such as those found in breads and cereals, which are absorbed more slowly. The athlete will, as a result, feel better and be able to perform longer. If an athlete wishes to consume a high sugar food before before an event they should be sure to drink plenty of water. An ideal food in this case is also fruit because it contains a large percentage of water. Table 10 indicates good and poor choices of energy foods.

Table 10

Energy Food Choices

Best Energy Sources	Poor Energy Sources
Fruit	Donuts
Fruit Juices	Pastries
Muffins	Candies
Dried Fruit	Soda Pop
Pasta	Chocolates
Bread, Rolls	Jam, Jelly

C. VITAMIN SUPPLEMENTATION

In general, vitamin supplementation is not required for an athlete, but for some, the psychological effects seem to be beneficial. It is recognized that vitamin deficiences can be damaging to performance due to their important role in metabolism. However, this does not mean that an athlete who is already well nourished will improve his/her performance with a vitamin supplement. As long as a healthy athlete eats a wide variety of foods from the four food groups (milk and milk products, breads and cereals, meat, fish, poultry and alternates, and fruits and vegetables) there is no need for a vitamin supplement.[41,42]

There is some controversy about the benefits of increasing certain vitamins to enhance performance. For example, it is believed that in long distance runners an increase in vitamin C is desirable since it holds the connective tissues together and thus prevents a considerable number of stress injuries such as pulled muscles and stress fractures.[43] However, this is no reason to consume megadoses of vitamin C, or any other vitamin, since the optimal amounts can be obtained in a well balanced diet. Vitamin supplementation is not only expensive, but can also be harmful if taken in amounts above the recommended levels.

The recommended nutrient intakes (RNI) for all vitamins have been established so that the levels ingested by healthy individuals will provide more than adequate amounts required to perform their specific function. Therefore, in the example cited above, the beneficial effects of vitamin C on athletic performance will automatically be felt by anyone who is receiving dietary vitamin C in the amount outlined by the RNI. In other words, vitamins can be obtained from food and a

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[41] D.F. Hanley, "Basic diet guidance for athletes," p. 23.

[42] R. Serfass, "Nutrition for the athlete, Update, 1982," p. 2.

[43] Round Table, "Nutritional Practices in athletics abroad," p. 37.

supplement is not necessary. The following table includes foods which are high in certain vitamins.

Table 11
Foods High In Common Vitamins

Vitamin A	Vitamin B	Vitamin C	Vitamin D
liver	breads & cereals	citrus fruits	milk
eggs	meats	strawberries	fortified margarine
milk	dairy products	melons	
carrots		tomatoes	
cantalope		potatoes	
		cabbage	

Vitamin E	Vitamin B12
vegetable oils	liver
wheat germ	kidney
mayonnaise	

More is not necessarily better in the case of vitamins. In fact, megadoses of vitamins are harmful. The fat-soluble vitamins A, D, E and K, are stored in the body and excessive amounts have been found to be toxic.[44] Megadoses of these vitamins may produce the same effects as a deficiency. In the case of water-soluble vitamins such as the B vitamins and vitamin C; these are not stored in the body so excessive amounts are excreted in the urine, putting extra burden on the kidneys. Table 12 lists some of the effects of vitamin and mineral overdoses.

D. MINERAL SUPPLEMENTATION

As with vitamins, mineral supplements are not recommended since adequate amounts may be obtained from eating a well-balanced diet. An exception to this rule may be iron. Iron deficiency is a common occurence in 25% of menstruating women.[45] Although

[44] A. Bentivegna, E.J. Kelly and A. Kalenak, p. 101.

[45] R.R. Pate, M. Maguire and J. VanWyk, "Dietary iron supplementation in women athletes," p. 81.

this is true, research indicates that there is no basis in recommending that all women athletes take an iron supplement. Only athletes with clinical proof of the deficiency should take oral supplements. It is important that coaches, trainers and team physicians be aware that a significant percentage of women are iron deficient and are consequently at an increased risk of developing anemia. A recommended practice is to include hemoglobin and iron storage tests as part of the medical screening for athletes. Serum ferritin and hemoglobin levels of female athletes should be checked periodically. There is no clear evidence linking iron deficiency with decreased performance, but iron deficiency can lead to anemia which may make the athlete feel sluggish, thus decreasing performance. To prevent iron deficiency, high iron foods such as liver, whole grains, dried fruits and dark green vegetables should be eaten.

A concept that should be mentioned here is 'sports' anemia. This anemia is not related to a mineral or vitamin deficiency, but rather, produced by vigorous exercise training. Some researchers believe that this anemic process is one of adaptation and is therefore advantageous to the athlete.[46] There are many theories suggesting the cause of sports anemia. Sports anemia is thought to be caused by increased fragility and hence destruction of the red blood cells which is thought to occur in athletes.[47] Another adaptation theory is that the borderline anemic state is optimal for oxygen transport and that the factors governing red blood cell production are fine-tuned to meet the daily stresses which athletes impose on their bodies.[48] Another possible cause of sports anemia is the increase in blood volume compared to hemoglobin.[49] Sports anemia can only be diagnosed when the history of the athletic participation

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[46] M. Williamson, "Anemia in runners and other athletes," p. 74.

[47] M. Williamson, p. 74.

[48] M. Williamson, p. 74.

[49] M. Williamson, p. 74.

has been reviewed and other forms of anemia, such as iron, folic acid or vitamin B12 anemia are ruled out. Sports anemia does not necessarily require any treatment since performance is not usually adversely affected.

Another consideration is the loss of minerals, particularily sodium and potassium chloride in sweat. In general these minerals are readily available in almost all foods and there should be no reason for deficiency. Athletes that perform for prolonged periods in hot weather should note that they will prespire more and salts and water will be lost. Replenishment can be obtained by drinking water and fruit juices, and by eating a well-balanced meal shortly after the event. The use of salt tablets should be discouraged since they are in high concentrations and will deplete potassium and cause further dehydration.

E. THE PRE-EVENT MEAL

There are no hard and fast rules governing what the pre-game meal should contain. The literature varies in what should be considered. Smith maintains that a specific pre-event meal plan is essential.[50] In summary, he suggests that the meal provide sufficient energy, include any food the competitor believes will enhance performance, be low in fat, modest in protein and high in carbohydrates and be relatively low in salt and bulky residue. He suggests that the meal be eaten three hours before the event in a congenial, relaxed atmosphere that enhances psychological preparation. Many of his suggestions are well-founded and in agreement with other sources. The reason for avoiding fats and protein in the pre-game meal is that they are digested slowly and not readily available as an energy source.[51] Carbohydrates provide a readily available, efficient source of energy that are easy to digest. However, they should not be concentrated sources of sugar such as honey, candy and soft drinks as they may cause gastrointestinal distress and cause early exhaustion.[52] Complex carbohydrates

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[50] N.J. Smith, "Nutrition game plans for athletes," p. 2.

[51] National Dairy Council, "Nutrition and human performance," p. 15.

[52] National Dairy Council, p. 15.

Table 12

Effects of Vitamin and Mineral Overdoses

Vitamin or Mineral	Effects of Overdose
Vitamin A	stunting of growth, bone fragility, vomiting, loss of hair and appetite, scaly skin, double vision, fatigue, irritability
Vitamin B:	
Niacin	tingling sensations, flushing of skin, throbbing in head
Thiamin	lethargy, vomiting, anorexia
Vitamin C	diarrhea, oxalate, wrate or cystine stones in urinary tract, false urine sugar tests
Vitamin D	bone and soft tissue calcification, kidney stones, headache, nausea, diarrhea, weight loss, convulsions, mental retardation
Vitamin E	interferes with Vitamin K, prolonged blood clotting time, diarrhea, intestinal cramps
Calcium	excessive calcification of bones and soft tissues, nausea, vomitting, diarrhea
Iron	iron poisoning - vomitting, diarrhea, lethargy, weak pulse

Source: Canadian Pharmaceutical Association, Compendium of Pharmaceuticals and Specialties, 1981.

such as whole grain cereals, pasta and fruits are absorbed more slowly and will not promote early exhaustion. However, caution is necessary to ensure that excess fiber is not obtained for fear of discomfort to the athlete. The reason for low salt consumption is that extra salt causes water to be drawn out of the cells (osmosis) and this can cause dehydration.

Although it is thought that the pre-event meal should contain those foods liked by the athlete (for psychological reasons) there are certain foods that have been shown to have distinct problems with regard to performance. Flatulence-producing foods such as legumes and cabbage should be avoided because they cause discomfort.

It is suggested that coffee and tea be avoided prior to the event as they have a diuretic effect. Alcohol is also frowned upon especially in sports where fine coordination is essential. There is some discrepancy in the literature about whether or not high-fiber foods should be included in the pre-event meal. Vitousek concludes that there is no need to avoid roughage as was previously thought.[53] However, various sources maintain that bland foods be eaten to minimize gastric distress and minimize a bloated feeling.[54] See Table 13 for a summary of good and poor choices for pre-event foods.

The benefits of complete liquid meals should not be ignored especially for athletes who are extremely nervous before the event and tend to have an upset stomach. Smith, and Buskirk, agree that a complete liquid meal that is high in carbohydrates is nutritionally sound for pre-event ingestion and solves digestion problems.[55,56] On the other hand, Lee maintains that commerical liquid meals are expensive though convenient and suggests that when a liquid preparation is necessary that it be homemade.[57]

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[53]S.H. Vitousek, "Is more better?", p. 15.

[54]E.R. Buskirk, p. 234.

[55]N.J. Smith, p. 2.

[56]E.R. Buskirk, p. 236.

[57]E. Lee, "Nutrition for athletes," p. 99.

Table 13

Pre-Event Foods

Foods to Avoid	Best Choices
beans and legumes	bread, rolls, etc.
beef and pork	cereal with skim milk
butter and margarine	clear soup
cabbage	crackers
candies, chocolate, etc.	fruit juices
coffee, alcohol	fruits
deli-type cold-cuts	lean chicken and fish
fried foods	low-fat cheese
jam, jelly etc.	pasta
regular cheese	raisins
rich desserts	vegetables
whole milk	water
	yoghurt

F. CARBOHYDRATE LOADING

According to Forgac, carbohydrate loading is separated into 3 phases:[58]

Phase I - the depletion phase - takes place on days 7-4 before the event
- muscles are depleted of their glycogen stores by exercising them to exhaustion
- diet during this phase is high-fat, high-protein, low-carbohydrate for three days
- glycogen content of muscles is kept low to stimulate glycogen synthesis in phase II
- possible problems during this phase include fatigue, irritability, nervousness or nausea due to low carbohydrate intake

Phase II - for 3 days before event
- the high carbohydrate phase in which diet remains adequate in protein and fat - a minimum of 1,000 - 2,100 calories a day from carbohydrate is needed
- exercise is not recommended as it depletes glycogen stores

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[58] M.T. Forgac, "Carbohydrate loading - A review," p. 42.

Phase III - day of the event

- important that the athlete eat anything he/she wishes; however, pre-event meal should be eaten 4-6 hours before so that stomach and upper bowel are empty at time of competition

Carbohydrate loading is only potentially beneficial for those endurance athletes who will deplete their glycogen stores which normally last 1½ to 2 hours.[59] Unfortunately, the carbohydrate loading regime has been misused by those who do not really need it (short term events) and by those marathoners who use it in excess.

Carbohydrate loading works on the premise that at the point at which endurance athletes deplete their glycogen stores they hit the legendary 'wall of fatigue'. If glycogen stores can be built-up, the athlete will last longer before the onset of the "wall" or perhaps even avoid it completely.

In early studies it was consistently found that subjects who had larger glycogen stores (muscle glycogen being the limiting factor in endurance exercise) had enhanced performance.[60] However, more recent studies have indicated that subjects consuming a diet high in carbohydrates experienced lower aerobic performance due to a reduced niacin intake that possibly hampered the aerobic oxidative pathways.[61] Whether or not carbohydrate loading is consistently beneficial is highly inconclusive; it seems to be very individualized and results vary greatly.

The depletion phase of carbohydrate loading is both physically and psychologically taxing. This is due to the lack of carbohydrate which is the only source of fuel for the brain and the most efficient source for muscle. Recently it has been found

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[59] M. Moore, "Carbohydrate loading: Eating through the wall", p. 98.

[60] M.T. Forgac, p. 42.

[61] M. Jette, O. Pelletier, L. Parker and J. Thoden, "The nutritional and metabolic effects of a carbohydrate-rich diet in a glycogen supercompensation training regime," p. 2147.

that the classic carbohydrate loading regime of depriving oneself of carbohydrates for three days is unnecessary. According to Moore, studies which have been conducted all conclude that the depletion phase is not necessary.[62] A heavy workout such as that in Phase I depletes muscles sufficiently. Followed by rest and lots of carbohydrates, is found to be as beneficial as the classic regime.

There are other intolerable aspects of carbohydrate loading. About 3 grams of water are stored with each gram of glycogen. According to Moore, some athletes complain that the extra weight and muscle stiffness impairs performance early in in an event.[63] But on the other hand, the extra water is an added protection against dehydration. Converselely, according to Harbarger, if enough water is not taken in during carbohydrate loading, the muscles will "steal" water from other organs to store the right amount along with glycogen. This selective dehydration from other organs can be dangerous. According to Forgac, the benefits of the extra energy from the glycogen stores and subsequent improvement in performance offsets any discomfort felt by the athlete.[65]

Athletes practicing carbohydrate loading should realize that excess deposits of glycogen can destroy muscle fibres, and that there is no data showing what happens to the muscles and hearts of athletes who do not use all of the muscle glycogen that was stored as a result of loading. Nelson notes that the effects of using the method over a competitive lifetime are unknown.[66] Also, some athletes using the

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[62] M. Moore, p. 98.

[63] M. Moore, p. 99.

[64] J. Hartbarger and N. Hartbarger, "Carbo-loading - how it works or fails to improve performance," p. 35.

[65] M.T. Forgac, p. 44.

[66] R.A. Nelson, "Nutrition and physical performance," p. 57.

carbohydrate-loading technique have experienced what may have been myoglobinuria, a type of protein in the urine. Athletes who develop any side effects from carbohydrate-loading should definitely restrict its use.

G. WATER

Water is one of the most important but most overlooked nutrients. The body of a well-trained adult contains about sixty to sixty-five percent water.[67]

Water is needed for the maintenance of body, the proper functioning of enzymes, the elimination of nitrogenous wastes, for digestion and metabolism; and for the transportation and utilization of nutrients in the muscles. Because of the many important roles that water plays, an imbalance in this very important nutrient can cause many severe problems, thereby seriously hindering performance.

Athletes who engage in stenuous activity in hot weather and who sweat profusely may lose as much as 2-4 litres of sweat per hour or from 6-8 pounds of body weight.[69] Marathon r nners are especially susceptible to water loss as are football, basketball and hockey players. Without adequate replenishment, dehydration will occur. Dehydration can lead to: deterioration in performance; an increase in body temperature; reduced volume of extracellular fluid; and reduced urinary volume resulting in kidney failure, a lowered blood volume, lower blood pressure, increased pulse rate and circulatory collapse if dehydration is severe enough.[70] In some cases where heat exhaustion is severe, death may occur.

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[67] D.F. Hanley, p. 22.

[68] D.F. Hanley, p. 22.

[69] American Dietetic Association, "Nutrition and physical fitness," p. 440.

[70] American Dietetic Association, p. 440.

In order to counteract the effects of dehydration, 10-20 ounces of liquid--preferably water--is recommended before the event. During the event 5-8 ounces of fluid should be ingested approximately every 10-15 minutes.[71] After the event replenishment from food and drink should take place. Table 14 gives the percentage water content of some common foods.

It should be noted that thirst is not an adequate indication of fluid needs. According to Smith, "sports participants who follow their sensation of thirst tend to compensate for less than half the water lost in a 24 hour period."[72]

In sports such as wrestling where a low weigh-in weight is desired, athletes often practice weight loss by dehydration. Both the American Dietetic Association and the American Medical Association emphatically state that this an unacceptable, dangerous practice.[73,74] When a weight loss is required, it should be done through caloric deficit so that fat, not water, is lost. Dehydration is an especially dangerous practice in amateur, high school athletes who are still developing and growing.

Excessive water lost has also been linked to depression, decreased learning capability, renal problems and growth reducation. Therefore, such practices as wearing rubber suits, using saunas, hot boxes and taking diurectics to lose weight are strongly discouraged.

H. CAFFEINE

Studies on the effect of caffeine on performance have provided divergent results;

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[71] R. Serfass, p. 2.

[72] N.J. Smith, p. 2.

[73] L.M. Hursh, "Food and water restriction in the wrestler," p. 915.

[74] American Dietetic Association, p. 440.

Table 14

Percentage Water Content of Some Common Foods

Food	% Water
beverages (most)	90 - 100
lettuce	96
cucumber	95
tomatoes	94
celery	94
green beans	92
brocolli	91
melon (cantaloupe, watermelon)	91
strawberries	90
grapefruit	89
milk	89
carrots	88
cereal, cooked (eg. oatmeal)	87
oranges	86
apples	84
soup (most)	80 - 90
cottage cheese	80
banana	76
potatoes	75
eggs	75
chicken	70
fish	68
meat	60
bread	35
cheddar cheese	37
butter and margarine	16
popcorn, nuts, etc.	4
cereals, ready to eat (eg. bran flakes)	3
oils	0

Source: U.S. Department of Agriculture, Nutritive Value of Foods, 1981.

this is thought to be due to the different effects caffeine has on individuals.

A study on the effects of caffeine on metabolism and exercise performance showed that the ingestion of 330 mg of caffeine (amount found in approximately 2.5 cups of coffee) 60 minutes before exercising significantly extended endurance in moderately strenuous exercise.[75] It is believed that caffeine promotes the use of fat as a fuel (lipolysis) for exercise, thus sparing the body's limited carbohydrate reserves. The spared muscle glycogen delays the onset of exhaustion and allows the athlete to perform longer than normal. If athletes chose to use caffeine to extend endurance they should realize caffeine also has many adverse affects. The biological effects of caffeine include cardiac muscle stimulation, a diurectic effect, and stimulation of gastric acid secretion and muscle relaxation. Caffeine is also thought to be carcinogenic (cancer causing).

Three to four hours after ingesting the caffeine the stimulant effect wears off and a depressing effect takes over, which decreases performance. Therefore, products containing caffeine should not be consumed during the meal preceding the event.

Caffeine is found in coffee, tea, cola, cold and allergy tablets, and the use of these products should be restricted to small amounts. The use of pure caffeine tablets may tax a person beyond the safe limits of physical capacity and constitute a long-range health hazard and therefore their use is highly discouraged.[76]

I. THE DIABETIC ATHLETE

Diabetes mellitus is a condition characterized by an inability of the body

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[75] J.L. Ivy, D.L. Costill, W.J. Fink and R.W. Lower, "Influence of caffeine and carbohydrate feedings on endurance performance," p. 8.

[76] J.L. Ivy, D.L. Costill, W.J. Fink and R. W. Lower, p. 10.

to utilize sugars completely. It is a condition in which the pancreas does not secrete enough insulin to supply the body with energy; sugar is left in the blood and not used by the body. Insulin is a natural hormone produced by the pancreas, a large gland located behind the stomach. It is required by cells to convert glucose into energy or store it for future use. Hyperglycemia, or high serum (blood) glucose, reduces work performance in two ways. First, it inhibits the mobilization of free fatty acids which are an important energy source for long term exercise. Second, if the serum glucose is high enough it can cause ketoacidosis which interferes with performance. Exercising promotes ketone production and lowers blood pH and both of these factors decrease work capacity. High production of ketones by the liver can lead to diabetic coma but with careful training ketoacidosis can be reduced. The goal of the insulin-dependent athlete is to keep blood sugars within the proper range and thus perform at maximum efficiency. This goal is usually achieved through treatment consisting of insulin, diet and exercise.[77]

The exercise component of the treatment triad for diabetes has lost its importance over the years due to the popularity of insulin. Nevertheless, in combination with diet and insulin, regular exercise is very beneficial. Recent studies have suggested that exercise programs benefit diabetics and are likely to improve blood sugar control. The active diabetic will feel more energetic and alive as they become more fit. There are usually no obstacles to developing an exercise program as long as proper diet and good control are practised. It is important to remember the three essential parts of good diabetes control: insulin, diet and exercise.

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[77] L.W. Cunningham, "The adult diabetic and exercise" in The Exercising Adult, p. 75.

Diabetic athletes must develop their training regime very carefully. For example, the insulin-dependent diabetic has to be careful to arrange a training schedule which avoids those times when the insulin is peaking in order to avoid exercise-induced hypoglycemia.[78] Following are some exercising guidelines for the insulin-dependent diabetic:[79]

1. Exercise every day at the same time of the day to synchronize your meal and injection schedules.
2. Inject your insulin into areas you don't use when exercising. When you inject insulin into the same areas you exercise, it will be absorbed faster by the body. This can cause hypoglycemia or low blood sugar. A good injection site when walking and running is the abdomen.
3. Avoid exercising when your insulin injection is reaching its peak effect. This means two to four hours after an injection of regular insulin or six to twelve hours after NPH for Lente insulin injections. A good time to work out is 15-30 minutes after a main meal when blood sugar is relatively high.
4. If urine is free of glucose, eat a snack before working out. A food with approximately 20 grams of carbohydrate is a good choice e.g., 6-12 ounces of fruit juice or two saltines.
5. Exercise should be avoided when diabetes control is not good. If ketones are present in the urine, exercise will cause a rise in blood sugar. In this case, exercise can be harmful and should be avoided until the condition is controlled.

Diabetics should never practice carbohydrate loading since both activity and diet are drastically changed and blood sugar levels will be disrupted. Diabetic runners may achieve the result of carbohydrate loading by altering their physical activity only. "The diabetic may use several days of strenuous exercise to deplete glycogen stores, followed by several days' reduced exercise to replenish and store extra glycogen".[80] Since runners sometimes tend to consume more food on inactive

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[78] R.W. Cunningham, p. 77.

[79] K. Berg, "The insulin-dependent diabetic runner," p. 75.

[80] K. Berg, p. 73.

days, the diabetic athlete may need to increase the insulin dosage to maintain acceptable blood glucose levels. To prevent glycogen depletion and insulin reaction during long-distance runs, a supplemental carbohydrate feeding should be consumed during the competition.

On the day of the event the athlete may become nervous and tense. The diabetic athlete must realize that nervous tension can cause hyperglycemia and may produce symptoms of insulin reaction, such as nervousness, increased irritability and muscle weakness. If the diabetic can not distinguish between these symptoms they may treat what seems to be an insulin reaction by consuming extra carbohydrate. In essence what is really being treated is just a case of the jitters and if extra carbohydrate is consumed, the diabetic could become hyperglycemic and even ketotic by race time. To distinguish between the case of jitters and an insulin reation, a urine test should be taken the morning of the event. If the morning urinalysis indicates a high sugar level or ketosis the diabetic should probably take an appropriate amount of quick-acting insulin and refrain from exercise until they are normoglycemic.[81] Non-insulin dependent diabetics by far outnumber those dependent on insulin. A high percentage of non-insulin dependent diabetics are obese; in fact, their diabetes is a secondary symptom of being overweight. Endurance exercising has the potential of normalizing blood sugar levels since both weight loss and physical training stimulate the action of insulin.[82] The loss of weight is a major objective in the treatment of non-insulin dependent diabetics. As with other overweight individuals, the diabetic can best accomplish this goal through proper diet and increased physical activity.

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[81] K. Berg, p. 73.

[82] L.W. Cunningham, p. 79.

J. RECOMMENDED READINGS

I. Popular Reading

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Florida State Department of Citrus. Physical Fitness and Nutrition for the Athlete. Lakeland: Florida State Department of Citrus, 1981. (Free) SOURCE: Florida State Department of Citrus, P.O. Box 148, Lakeland, Florida 33802.

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General Mills, Inc. Food for Fitness. Minneapolis: General Mills, Inc., (1979?). ($0.35) SOURCE: Nutrition Department, General Mills, Inc., Department 45, P.O. Box 1112, Minneapolis, Minnesota 55440.

General Mills Inc., Food In Training. Minneapolis: General Mills, Inc., (1979?). ($0.35) SOURCE: Nutrition Department, General Mills, Inc., Department 45, P.O. Box 1112, Minneapolis, Minnesota 55440.

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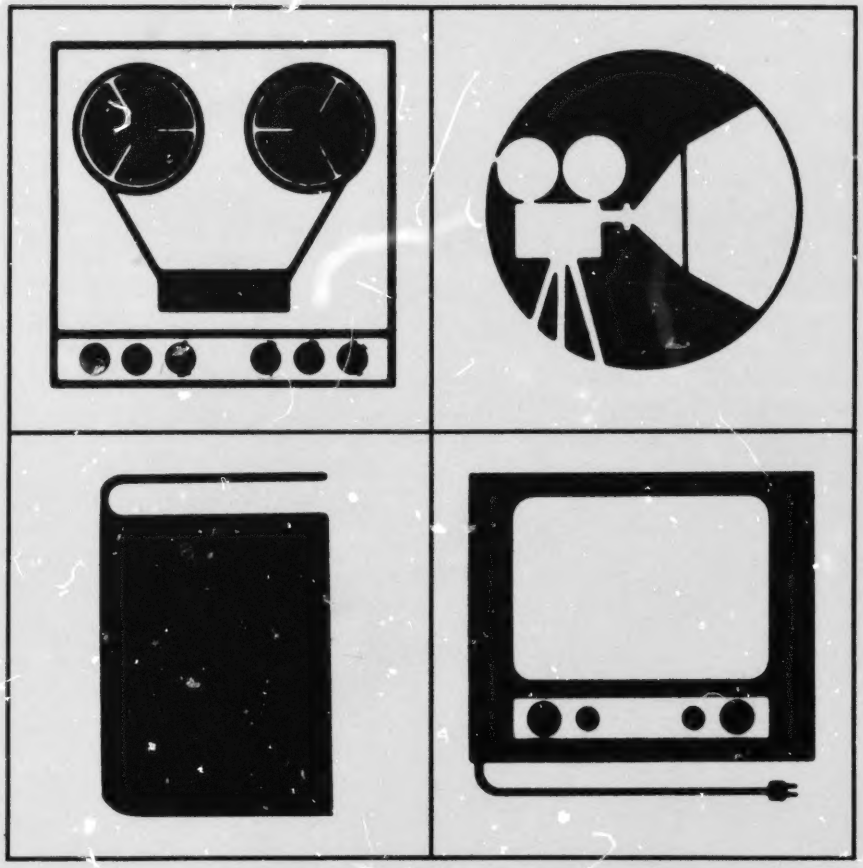
BACKGROUND RESOURCE ON NUTRITION AND FITNESS



BACKGROUND RESOURCES ON NUTRITION AND FITNESS

A selection of recommended background resources is outlined in this section. Curriculum guides, teaching aids and audiovisuals; periodicals and organizations are listed and described.

A. CURRICULUM GUIDES, TEACHING AIDS AND AUDIOVISUALS

Materials appropriate for use with groups ranging from elementary children to adults were screened for accuracy of nutrition topics and those containing reliable information and an element of motivational instruction are included here. Manuals, guides, teaching kits, posters, games, filmstrips, slide sets, audiotapes, videotapes and films are among the formats listed and described.

I. Lifestyle: Nutrition and Fitness

BALANCE. Poster
This colorful poster displays the energy in/energy out concept which is depicted by a balance scale with foods on one side and people engaged in various activities on the other. Also gives ideas on how to develop fitness, improve health and control weight. For general health and nutrition education uses. Smaller than standard size. Free.
SOURCE: Health and Welfare Canada, Promotions and Communications Section, Fitness and Amateur Sport Branch, Journal Towers, 365 Laurier Avenue West, Ottawa, Ontario K1A 0X6

BASIC FOOD GROUPS. Poster
This illustrated full-color poster shows the four vegetarian food groups. A useful aid in teaching vegetarian diets. Standard size. $2.95.
SOURCE: Professional Health Media Services, Inc., P.O. Box 922, Loma Linda, California 92354

BE A GOOD SPORT. Folder with activity cards, $2.00. Durham, New Hampshire: Nutrition at Work, 1980.

A set of activity sheets designed to integrate fitness and diet through the use of specialty menus and promotions. For elementary level use. SOURCE. Nutrition at Work, Barton Hall, University of New Hampshire, Durham, New Hampshire 03824

BODY WORKS - THE KID'S GUIDE TO FOOD AND PHYSICAL FITNESS. $8.99 New York: Random House, 1979.

Designed for the 10-14 year-old age group, this manual covers all lifestyle topics. A highly readable book, with stories, motivational information and suggested activities. Also available as a curriculum package; see "From the Inside Out" listing in this section. SOURCE: Random House, 201 E. 50 St., New York, New York, OR Random House of Canada, College Division, 5390 Ambler Drive, Mississauga, Ontario L4W 9Z9

BUILDING WELLNESS LIFESTYLES-COUNSELOR'S MANUAL. $12.00. Montclair, New Jersey: Frost Valley YMCA, 1980.

This manual provides a guide to program planning and development within the theme of healthy lifestyles. Description of 48 activities centering on fitness, nutrition, drugs, toothcare, mental health and other topics is provided. SOURCE: Wellness Resource Center, Frost Valley YMCA, 298 Claremont Avenue, Montclair, New Jersey 07042

CANADA'S FOOD GUIDE. Poster
The four food groups from Canada's Food Guide are displayed, using both pictures and words. A useful teaching aid for most age groups. Standard size. Free. SOURCE: Health and Welfare Canada, Health Promotion Directorate, Health Services and Promotion Branch, Tunneys Pasture, Ottawa, Ontario K1A 1B4

THE CORONARY CARE UNIT. Poster
On one side is a full-color display of more than 200 everyday foods are identified as good for the heart and not-so-good for the heart. On the other side a complete program of preventative cardiology covering heart attacks, coronary risk factors, exercise, cholesterol, bad coronary habits and good coronary habits is presented. For patients on low cholesterol and unsaturated fat diets. Standard size. $3.95. SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

THE CULINARY HEARTS KITCHEN COURSE. New York Heart Association, 1982. 259 slides: col. and audiocassette, 5 posters: col., reproducible handouts and recipe sheets, instructor's manual. Purchase: $95.00

A series of six two-hour lessons cover recipe modification; fat, salt, cholesterol and calorie reduction in recipes and menu planning. Designed for cardiac patients. SOURCE: New York Heart Association, 205 E. 42nd St., New York, New York 10017

DESIGN FOR HEALTH. $8.00. Andover, Massachusetts: The Network, Inc., 1980.

An activity-orientated fitness, weight control, nutrition and self-image curriculum designed for secondary students. SOURCE: The Network, Inc., Project Outside/Inside, 290 South Main Street, Andover, Massachusetts 01810

DESIGN FOR HEALTH-TEACHER'S MANUAL. $8.00. Andover, Massachusetts: The Network, Inc., 1980.

Background information and objectives for a program in fitness, weight-control, nutrition and self-image are provided. SOURCE: The Network, Inc., Project Outside/Inside, 290 South Main Street, Andover, Massachusetts 01810

DIETARY MANAGEMENT. Milner Fenwick, Inc., 1976. 1 film cassette (10 min.): sd., col., super 8mm, 16 mm or 3/4" video cassette. Purchase: $220.00

Dietary management of heart disease patients is discussed. Reduction of cholesterol and fat in meals is emphasized. Suitable for adults. SOURCE: Milner-Fenwick, Inc., 3800 Liberty Heights Avenue, Baltimore, Maryland 21215

THE DOOFUS STORIES. $32.50. Teacher's guide, storybook, 71 worksheets, 118 word cards, 8 posters. Boston: Learning For Life, 1979.

A complete curriculum program for elementary children covering food and fitness. SOURCE: Learning for Life/MSH, 141 Tremont Street, Boston, Massachusetts 02111

EAT BETTER-FEEL GREAT GUIDE. Poster
This poster lists 14 tips on how to eat and feel better. Some of the tips include eating less salt, sugar, fat and cholesterol. It also stresses eating a variety of foods, keeping blood cholesterol and blood pressure low, checking food labels, eating food with few additives, exercising 3 or more times a week and shaking the caffeine habit. Standard size. $5.00. SOURCE: Community Nutrition Institute, 1146 19th Street N.W., Washington, D.C. 20036

THE FIT-FOR-LIFE PROGRAM. $51.00. Curriculum guide; teacher's guide; student workbook. West Lafayette, Indiana: Purdue Research Foundation, 1982.

Written to help develop good health through aerobic fitness and weight control, this program explores exercise, obesity and nutrition. SOURCE: Purdue Research Foundation Division of Sponsored Programs, Houde Hall, West Lafayette, Indiana 47907

FITNESS AND Y.O.U.-FIT TO LAST. TV Ontario and the Ontario Heart Foundation, 1983. Various formats available (30 min.). Purchase: Price varies, write for rates.

The benefits of fitness and nutrition for adolescents are explored. SOURCE: Non-profit organizations and educational institutions in Ontario: TVO Customer Service, Box 200, Station Q, Toronto, Ontario M4T 2T1. All others contact the Marketing Department at the above address.

FOOD AND NUTRITION: AN INTERMEDIATE SCIENCE UNIT. Poster
These 33 posters are used as an aid in teaching elementary science students about food and nutrition. Posters contain facts and suggest exercises and experiments that can be done in the classroom. Also included are ditto masters and teaching guide. Smaller than standard size. $17.60 (order no. 09-6025). SOURCE: J. Weston Walch, Publisher, P.O. Box 658, Portland, Maine 04104

FOOD COMBINING CHART. Poster
This attractive four-color chart teaches how to properly combine fruits, grains, vegetables and nuts to enjoy better digestion and nutrition. Meal planning is made fun and easy with this informative chart. It is beautifully and clearly illustrated with original full-color drawings. Sample menus, simple rules for combining natural foods, and principles of eating are also included. Printed on heavy weight, 'no smudge' textured stock. Standard size. $4.50 (order no. FHX 29085). SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

THE FOOD COMPOSITION UNIT. Poster
A colorful illustrated reference chart covering dozens of foods; by calories, proteins, vitamins, minerals and fats, and salt content. Information is graphically displayed on the effects of food preparation and processing: from apple, to apple juice, to apple sauce, to apple pie. Standard size. $3.95 (order no. NHS 29082). SOURCE: Professional Health Media Services, Inc., P.O. Box 922, Loma Linda, California 92354

FITNESS FOCUS. Set of 6 spirit masters, two transparencies, poster and teacher's guide, $2.50. St. Paul: Kellogg Company, 1980.

Stresses lifestyle factors such as exercise, nutrition and rest. A series of six activities are used to evaluate diet and fitness level. Puzzles and other activities are used. SOURCE: Kellogg's Fitness Focus, P.O. Box 5012, Kalamazoo, Michigan 49003

FOOD FOR THE HEALTH OF IT. $8.00. Andover, Massachusetts: The Network, Inc., 1979.

This activity-orientated curriculum demonstrates the relationships between diet and disease. For senior high school students. SOURCE: The Network, Inc., Project Outside/Inside, 290 South Main Street, Andover, Massachusetts 01810

FOOD FOR THE HEALTH OF IT-TEACHER'S MANUAL. $8.00. Andover, Massachusetts: The Network, Inc., 1979.

This guide provides activity guides, resource lists and background information designed to supplement the student manual described in the preceding entry. SOURCE: The Network, Inc., 290 South Main Street, Andover, Massachusetts 01810

FOOD FOR THE HEALTHY HEART. Poster
Using the Canada Food Guide, this poster shows the food recommended for a healthy heart. Standard size. Free. SOURCE: The Ontario Heart Foundation, 576 Church Street, Toronto, Ontario M4Y 2S1.

FROM THE INSIDE OUT. Teacher's guide, $13.95; student book, $7.50; 118 word cards, $5.95; 10 posters, $6.95; 50 worksheets, $3.00. Boston: Learning for Life, 1979.

This curriculum and supporting materials stress improvement of lifestyle for the 10-14 year-old age group. SOURCE: Learning for Life/MSH, 141 Tremont St., Boston, Massachusetts 02111

HEALTH & LIFESTYLE: POSITIVE APPROACHES TO WELL-BEING. Spectrum Films, 1980. 1 film reel (28 min.): sd., col., 16 mm or 3/4" videocassette. Purchase: $485.00 Rental: $65.00/3 days

Nutrition, stress, exercise, obesity and drug use are the topics covered in this up-to-date production. SOURCE: Spectrum Films, 2785 Roosevelt Street, Carlsbad, California 92008

HEALTHY HABITS FOR A HEALTHY LIFE. Film Fair Communications, 1981. 1 film reel (16 min.): sd., col., 16 mm. Purchase: $325.00. Rental: $30.00

The consequences of poor dietary, exercise and social habits are outlined and the alternative of healthy living habits is presented. SOURCE: Film Fair Communications, 10900 Ventura Blvd., Studio City, California 91604

A HEALTHY HEART IS A FAMILY AFFAIR. Poster
Five posters highlighting what families can do about the main risk factors associated with heart disease and stroke. Standard size. Free. SOURCE: Ontario Heart Foundation, 576 Church Street, Toronto, Ontario M4Y 2S1

A HEALTHY HEART IS A FAMILY AFFAIR-DIET. Poster
Points out how to reduce total saturated fat intake as a preventative measure in heart disease. Standard size. Free. SOURCE: Ontario Heart Foundation, 576 Church Street, Toronto, Ontario M4Y 2S1

A HEALTHY HEART IS A FAMILY AFFAIR-EXERCISE AND RELAXATION. Poster
Points out exercise as a preventative factor in heart disease. Standard size. Free. SOURCE: Ontario Heart Foundation, 576 Church Street, Toronto, Ontario M4Y 2S1

THE HYPERTENSION UNIT. Poster
In full color, this poster is an easily understood salt-control program for hypertensive patients. On the reverse side are 17 panels of information on high blood pressue and its management. A practical, informative guide to high blood pressure control. Standard size. $3.95. SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

THE LOW SALT UNIT. Poster
On one side, in full color, several hundred everyday food items are color-coded into 4 categories of sodium content. On the other side are 15 panels of information on salt and low-salt cooking. Emphasizes good eating on a low-salt diet. Standard size. $3.95. SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

NASCO'S NUTRITION AND EXERCISE GAME. Gameboard with cards and playing pieces. $16.95. Modesto, California: Nasco, 1981.

Proper eating and exercise habits are emphasized in this game. SOURCE: Nasco, 901 Janesville Ave., Ft. Atkinson, Wisconsin 53538

NUTRITION IN A CHANGING WORLD: A CURRICULUM FOR JUNIOR HIGH HEALTH. $12.00. University Park: Pennsylvania State University, 1981.

Covers weight control, athletic diets, vegetarianism and general nutrition topics. Includes learning activities, student material originals, appendices and background information for teachers. SOURCE: Carol Byrd-Bredbenner, Assistant Professor of Nutrition, Pennsylvania State University, University Park, Pennsylvania 16802

NUTRITION IN THE PARK. $10.00. London, Ontario: London Board of Education, 1979.

Nutrition-related activities designed for use in summer camps, park programs, health fairs and schools are presented in this manual. Food functions, snacks, dental disease, weight control and ethnic foods are the topics covered. SOURCE: Program Department, London Board of Education, Box 5873, London, Ontario N6A 4T5

THE POKIS PROGRAM. $62.00. Curriculum guide; filmstrip and audiocassette. West Lafayette, Indiana: Purdue Research Foundation, 1981.

This educational program for elementary schools focuses on the concepts of physical fitness and obesity prevention. Nutrition, aerobic fitness and weight control are the featured topics. SOURCE: Purdue Research Foundation Division of Sponsored Programs, Houde Hall, West Lafayette, Indiana 47907

RATE YOUR PLATE. The Network, Inc., 1979. 3/4" videotape (30 min.): sd., col. Purchase: $60.00. Rental: $20.00/week.

Uses at TV game show format to illustrate diet education. Various other sketches develop lifestyle concepts such as the effect of diet on health. SOURCE: The Network, Inc., Project Outside/Inside, 290 South Main Street, Andover, Massachusetts 01810

SHAKE THE HABIT! LEARNING TO LIVE WITHOUT SALT. The Polished Apple, 1982. 43 slides: col. and audiocassette, 12 min. Purchase: $89.75.

Provides practical advice for both those wishing to reduce sodium intake and patients on sodium restricted diets. SOURCE: The Polished Apple, 3742 Seahorn Drive, Malibu, California 90265

SODIUM SCOREBOARD. Poster
Lists the sodium content of over 250 brand-name foods in categories such as soups, frozen foods and fast foods. "Sodium Scoreboard" is an indispensable guide for those who want to lower their chances of developing high blood pressure, and for those who have already been told to follow a low-sodium diet. Standard size. Laminated 1 to 9 $6.00; 10 to 49 $2.50; 50 or more $2.00. SOURCE: Center for Science in the Public Interest, 1755 S. Street N.W., Washington, D.C. 20009

SUGAR CHART. Poster
Graphically displayed, this poster lists high sugar foods with the number of teaspoons of sugar per food. With eye-catching cartoons, this is an attractive poster for the dental office and classroom. Standard size. $2.95. SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

TEENAGE NUTRITION: THE PICTURE OF HEALTH. Current Affairs Films, 1977. Filmstrips: Pt. I, 73 frames; Pt. II, 80 frames, col., audiocassettes and teaching guide.

In part one, general nutrition concepts are outlined with particular emphasis on areas related to athletes. Weight control is covered in part two. Designed for adolescent audiences. SOURCE: Current Affairs Films, 24 Danbury Road, Wilton, Connecticut 06897

THE VEGETARIAN UNIT. Poster
On the face side, in full color, the ingredients of a healthful, balanced vegetarian diet are illustrated. The other side discusses the protein needs of lacto-ovo-vegetarians. Useful aid in teaching about vegetarian diets. Standard size. $3.95. SOURCE: Professional Health Media Services, Inc., Box 922, Loma Linda, California 92354

VEGETARIANSIM IN A NUTSHELL. The Polished Apple, 197?. 84 slides: col. and audiocassette, 14 min. Purchase: $79.95

The health aspects of vegetarian diets are explored, and practical advice is presented. SOURCE: The Polished Apple, 3742 Seahorn Drive, Malibu, California 90265

WHOLE BODY MANUAL. Perrenial Education, 1977. 1 film reel (17 min.): sd., col., other formats available. Purchase: $280.00. Rental: $28.00.

Proper diet and physical activity are promoted in this production aimed at secondary school students. SOURCE: Perrennial Education, Inc., 477 Roger Williams, Box 855-Ravina, Highland Park, Illinois 60035

YOUR CORONARY CARE DIET. The Polished Apple, 1982. 35 slides: col., audio-cassette and leader's guide, 11 min. Purchase: $89.75

Sodium, cholesterol and fat reduction are stressed in terms of pratical application. Designed for the heart disease patient. The accompanying program guide includes selected references. SOURCE: The Polished Apple, 3742 Seahorn Drive, Malibu, California 90265

II. Weight Control-Diet and Exercise

BE SIZE WISE--DON'T LOSE YOUR BALANCE
Poster, $2.00 and pamphlets, $3.50/hundred. Seattle: American Heart Association of Washington, 1980?

Aimed at adolescents, this poster and accompanying pamphlet cover the elements of weight management. SOURCE: American Heart Association of Washington, 4414 Woodland Park Ave., N., Seattle, Washington 98103

BEHAVIOR MODIFICATION FOR OBESITY. American Dietetic Association, 1979. Videocassette, all formats (120 min.): sd., col., and study guide. Purchase: $225.00. Rental: $45.00/3 days.

Designed for use by health professionals, this program covers all factors of successful behavior modification for weight reduction. SOURCE: USCAN International, 205 W. Wacker Drive, Chicago, Illinois 60606

CALORIE-COMPARISON CHARTS. Poster
These 8 bar-graph charts illustrate the calorie content of various foods. Colored-coded by caloric density. Smaller than standard size. $14.50. SOURCE: Nutrition Graphics, 336 N. W. 29th Street, Corvallis, Oregon 97330

CALORIE-EXERCISE EQUIVALENTS. Poster
The calories in foods under the main headings of 'Main Dishes', 'Fruits and Vegetables' and 'Other Common Snacks' are given. The amount of time required to work off those calories from sitting, walking, biking, swimming, and jogging is given. Useful aid when teaching nutrition and obesity to elementary students. Smaller than standard size. $6.00 (set of 9). SOURCE: Learning for Life/MSH, 141 Tremont Street, Boston, Massachusetts 02111

CALORIES, FOOD AND ACTIVITY. Set of 17 flipcharts, $2.00. Ithaca: Cornell University, 1978.

A series of charts which stress calories and physical activity as components of weight control. SOURCE: Media Services - Printing, B-10 Martha Van Rensselan Hall, Cornell University, Ithaca, New York 14853

COMPREHENSIVE WEIGHT CONTROL PROGRAM. BMA Audiocassettes, 1980. 6 Audio Cassettes (60 min. each): 2 study guides. Purchase: $75.00.

Psychological and lifestyle factors relating to obesity are outlined in this series of tapes. Exercise, food intake and feelings are discussed. SOURCE: BMA Audio Cassettes, 200 Park Avenue South, New York, New York 10003

DO'S AND DONT'S OF WEIGHT CONTROL. Poster
Each of these 18 two-color posters contains illustration and text directed at adolescents. Smaller than standard size. $6.00. SOURCE: J. Weston Walch, Box 658, Portland, Maine 04104

FAD DIETING? A PORTFOLIO OF RESOURCE MATERIALS. $3.00. Ithaca: Cornell University Cooperative Extension Service, 1974.

Six sections covering body type, body image, nutrient needs, physical activity and diet assessment make up this kit. Contains varied teaching resources. SOURCE: Cornell University, Building #7, Research Park, Ithaca, New York 14853

FAT REDUCTION IN THE DIET: A PRESCRIPTION FOR WEIGHT CONTROL. Food models; teacher's guide, 77 pp.; set of 5 spirit masters. $59.95. Fort Atkinson, Florida: Nasco, 1981.

A five pound plastic model of human fat and several actual size models of fatty foods are designed to provide impact. One gram "cubes" of fat are to be used to illustrate the amount of fat, by weight, in foods. SOURCE: Nasco, 901 Janesville Avenue, Fort Atkinson, Wisconsin 53538

HOW TO BURN 100 CALORIES. Poster
The relationship between calories and exercise is outlined in chart form. Four-color. Standard size. Free. SOURCE: Fitness Canada, 365 Laurier Avenue West, Ottawa, Ontario K1A 0X6

HOW TO LOSE WEIGHT. Sunburst Communications, 1978. Filmstrips: Pt. I, 68 frames; Pt. II, 87 frames, col., audiocassettes, 14 and 19 min., and teacher's guide. Purchase: $99.00.

Covers research, causes and incidence of obesity and modification of eating behavior and energy expenditure. A comprehensive teaching guide is included. For adolescent audiences. SOURCE: Sunburst Communications, 39 Washington Avenue, Pleasantville, New York 10570

JOIN THE TRIM TEAM. Set of 7 black and white posters; 6 color menu posters, and six lesson plans with handout originals. $2.50. San Francisco: Cling Peach Advisory Board, 1982.

The lesson plans emphasize weight control through a balanced diet and exercise with handouts to correspond to the black and white posters. The color menu posters all feature dishes including peaches. SOURCE: Cling Peach Advisory Board, One California Street, San Francisco, California 94111

LET'S SHAPE UP! Professional Health Media Services, 1974. 77 Slides: col., audio-cassette and script. Purchase: $37.95.

The concept of energy balance in weight control is outlined for adolescent to adult audiences. SOURCE: Professional Health Media Services, P.O. Box 922, Loma Linda, California 92354

LIFESTYLE CHANGES FOR WEIGHT CONTROL. Lesson Plans. $26.50. North Reading: Nutrition Education Services, 1980?

This 20 session weight control program covers nutrition, fitness, behavior modification, and stress. Designed for adults. SOURCE: Nutrition Education Services, 42 Nutter Road, North Reading, Massachusetts 01864

ROLY POLY BLUES. Perennial Education, 1981. Videocassette, all formats (42 min.): sd., col. Purchase: $300.00. Rental: $30.00.

The causes of obesity are discussed and various approaches to treatment are presented. SOURCE: Perennial Education, 477 Roger Williams, Box 855-Ravina, Highland Park, Illinois 60035

SHAPEDOWN: WEIGHT MANAGEMENT PROGRAM FOR ADOLESCENTS. Reader's guide $11.00; workbook $11.00. San Francisco: Balboa Publishing, 1980.

Outlines 14 weekly sessions to change eating behaviors which lead to weight problems. The leader's guide provides background information, program guidelines and procedures for weekly sessions. The participant's workbook provides reading and activities for each session. SOURCE: Balboa Publishing, P.O. Box 26427, San Francisco, California 94126

SHAPING UP. The Polished Apple, 197? 149 slides: col. and audiocassette, 20 min. Purchase: $130.75.

Designed for adolescents wanting to control weight problems, this two-part audiovisual stresses proper diet and exercise. SOURCE: The Polished Apple, 3742 Seahorn Drive, Malibu, California 90265

SUPERJOCK SCALES DOWN. Journal Films, 1980. 1 film reel (15 min.): sd., col., 16 mm Purchase: $255.00. Rental: $30.00/3 days

An obese middle-aged man attempts to lose weight. Caloric intake and exercise are emphasized, along with salt, fat, and sugar reduction. SOURCE: Journal Films, 930 Pitneer Avenue, Evanston, Illinois 60202

WEIGHING THE CHOICES: POSITIVE APPROACHES TO NUTRITION. Spectrum Films, 1981. 1 film reel (20 min.): sd. col., 16 mm or 3/4" videocassette. Purchase: $430.00. Rental: $65.00/3 days.

Nutrition as a lifestyle factor is examined in detail and projected into a weight control program. SOURCE: Spectrum Films, 2785 Roosevelt Street, Carlsbad, California 92008

WEIGHT CONTROL. Professional Research, 1975. 1 film reel (13 min.): sd., col., 16 mm. Purchase: $245.00. Rental: $25.00.

Covers the causes and prevention of obesity and provides sound, practical advice on permanent weight control. SOURCE: Film Fair Communications, 10900 Ventura Blvd., Studio City, California 91604

THE WEIGHT CONTROL UNIT. Poster
This full-color poster provides three different caloric level diets on the front and instructions on the back. Standard size. $3.00. SOURCE: National Health Systems, P.O. Box 1501, Ann Arbor, Michigan 48106

III. Athletic Performance-Nutritional Aspects

THE ATHLETE'S NEED FOR SALT, WATER AND VITAMINS. Convention Cassettes of San Francisco, 1981. Audiocassette (60 min.). Purchase: $7.00.

Taped at a nutrition and athletics conference sponsored by the American Heart Association, this recording covers water balance and vitamin and mineral supplementation. SOURCE: Convention Cassettes of San Francisco, 1255 Post Street, Suite 728, San Francisco, California 94109

EAT TO COMPETE. University of California, 1982. 80 slides: col. and audiocassette, 25 min. Script, 18 p. Purchase: $42.16, Workbook $3.00.

Aimed at adolescent athletes, this production covers most of the areas involved in nutrition and athletic performance. SOURCE: Visual Media, University of California, Davis, California 95616

EXER-GUIDE. Poster
A colorful informative poster emphasizing the health benefits of exercise. Nutrition in athletics and weight control are also featured. Standard size. $3.00. SOURCE: Center for Science in the Public Interest, Box 3099, Washington, DC 20010

FOOD FOR FITNESS: THE PHYSICAL EDUCATION TEACHER'S HANDBOOK. 171 p. $15.00. New Orleans: St. Mary's Dominican College, 1981.

Designed for physical/health education teachers and coaches, this book outlines basic nutrition principles with related fitness and sports material accompanying the general information. Pre and post-tests and study questions are included, along with a resource bibliography. SOURCE: Bookstore, St. Mary's Dominican College, 7214 St. Charles Avenue, Box 803, New Orleans, Louisiana 70118

NUTRITION AND ATHLETIC PERFORMANCE. University of Wisconsin, 1980. 3/4" videotape (40 min.): sd. col., also available in ½" Beta I or ½" VHS. Purchase: 3/4", $44.00; others, $34.00.

Designed for coaches, parents, college level students and other health professionals, this program covers all nutrition-related topics for the athlete. SOURCE: Instructional Media Distribution Center, Room 109, Teacher Education Building, 225 North Mills St., Madison, Wisconsin 53706

NUTRITION AND EXERCISE. Sunburst Communications, 1980. Filmstrips: Pt.I, 70 frames; Pt. II, 80 frames: col., audiocassette, 12 and 12½ min. and teacher's guide. Purchase: $99.00.

Aimed at adolescent audiences. Part one covers basic nutrition in relation to exercise; part two deals with sports nutrition. The teacher's guide includes a resource list. SOURCE: Sunburst Communications, 39 Washington Avenue, Pleasantville, New York 10570

NUTRITION AND THE ATHLETE. Swanson Center for Nutrition, 1977. 3/4" videocassette (26 min.): sd., col. Purchase: $51.95.

Health and education professionals discuss nutritional concerns of athletes in this informative production. SOURCE: Swanson Center for Nutrition, Inc., 8401 West Dodge Road, Room 101, Omaha, Nebraska 68114

NUTRITION FOR SPORTS: FACTS AND FALLACIES. Alfred Higgins Productions, 1981. 1 film reel (20 min.): sd., col., 16 mm. Purchase: $395.00 Rental: $41.00

An informative guide to nutrition as it relates to athletics. For secondary to adult audiences. SOURCE: Alfred Higgins Productions, Inc., 9100 Sunset Blvd., Los Angeles, California 90069

NUTRITION SPORTS MOBILE. Poster
Appropriate for elementary grades, this mobile depicts children enjoying oranges and engaging in various physical activities. Smaller than standard size. Free. SOURCE: Sunkist Growers, Inc., Consumer Services, Box 7888, Van Nuys, California 91409

NUTRITION SUPERSTARS: A NUTRITION-PHYSICAL FITNESS KIT. Binder, grades 5-6, $11.20; Binder, grades 7-8, $9.00. Phoenix: Arizona Department of Education, 1979.

A series of lesson plans are presented to teach the lifestyle concepts of fitness and nutrition to upper elementary school children. Over 40 worksheet orgininals are included with each kit and a resource guide is provided. SOURCE: Nutrition Super Stars, Food and Nutrition Division, Arizona Department of Education, 1535 West Jefferson, Phoenix, Arizona 85007

POTENTIAL CONTRIBUTION OF NUTRITION TO ATHLETIC PERFORMANCE. Convention Cassettes of San Francisco, 1981. Audiocassette (60 min.). Purchase: $7.00.

Taped at a nutrition and athletics conference sponsored by the American Heart Association this recording covers body composition and the role of diet. SOURCE: Convention Cassettes of San Francisco, 1255 Post Street, Suite 728, San Francisco, California 94109

SPORTS ACTION AND HEALTH. AIMS Instructional Media Services, 1976. 1 film reel (22 min.): sd., col., 16 mm. Purchase: $315.00. Rental: $30.00.

Various athletes promote healthy lifestyles. Although the emphasis is on physical activity, the role of nutrition is covered. Designed for secondary students. SOURCE: AIMS Instructional Media Services, 626 Justin Avenue, Glendale, California 91201

SPORTS NUTRITION KIT. Binder of information and two posters. $10.83. Phoenix: Arizona Department of Education, 1982.

Designed for coaches, physical education teachers and health professionals, this kit provides basic information and guidelines for applying knowledge in the classroom. Instructional materials, a resource directory, references and appendices are included. SOURCE: Sports-Nutrition, Food and Nutrition Division, Arizona Department of Education, 1535 West Jefferson, Phoenix, Arizona 85007

B. PERIODICALS

Letters of inquiry were sent to over 100 publishers of periodicals in the health, nutrition, fitness and althletic areas. Publishers were identified through directories. Numerous other periodicals were examined in Toronto libraries. Of the periodicals identified, some were rejected due to either lack of nutrition content or inclusion of unreliable nutritional advice. Listed here are those periodicals which provide frequent and reliable articles on nutrition and related lifestyle topics.

I. Popular Periodicals

AMERICAN HEALTH-FITNESS OF BODY AND MIND 1982- (Bimonthly) $12.00/year. New York: American Health Partners.

Written a popular style similar to Psychology Today, this magazine reports on current research into health with an emphasis on fitness, stress, nutrition and lifestyle factors. In addition to feature articles on nutrition a news digest called "The Nutrition Report" is included. Nutrition content appears reliable although some research is reported in a sensationalized manner. SOURCE: American Health, P.O. Box 10034, Des Moines, Iowa 50347

A.S.C.H. NEWS AND VIEWS 1979- (Bimonthly) $35.00 individual yearly subscription ($175.00 for institutions) includes membership, the newsletter and other publications. New York: American Council on Science and Health.

Interviews, articles written by the A.C.S.H. staff, and detailed book reviews make up this newsletter, which attempts to "promote scientifically balanced evaluations of chemicals, the environment and human health". SOURCE: American Council on Science and Health, 47 Maple Street, Summit, New Jersey 07901

BIKE REPORT 1975- (Bimonthly) $18.00/year membership. Missoula, Montana: Bike-centennial - The Bicycle Travel Association.

A registered dietitian with an exercise physiology background contributes a one-page nutrition article per issue. SOURCE: Bike Centennial, P.O. Box 8308, Missoula, Montana 59807

ENVIRONMENTAL NUTRITION NEWSLETTER 1978- (Bimonthly) $15.00 in U.S., $17.00 in Canada. New York: Environmental Nutrition, Inc.

This is "a consumer's guide to survival". Editors and writers are all Registered Dietitians. It contains short articles, book reviews and occasional recipes. SOURCE: Environmental Nutrition, Inc., 52 Riverside Drive, Suite 15-A, New York, New York 10024

THE FITNESS BULLETIN 1978- (Monthly) $20.00/year, $35.00/2 years. Toronto: The Fitness Institute.

Each issue includes articles on fitness-related nutrition topics. SOURCE: The Fitness Institute, Dept. T.D., 255 Yorkland Blvd., Willowdale, Ontario M2J 1S3

HEALTH 1968- (Monthly) $18.00/year. New York: Family Media, Inc.

Accurate food and nutrition articles are included in each issue. The magazine appears to use more of a "beauty" or trendy philosophy rather than one of health maintenance and disease prevention. SOURCE: Health, P.O. Box 3600, Bergenfield, New Jersey 07621

HEALTH NEWS DIGEST 1982- (Bimonthly) $10.00/year membership. Toronto: Health League of Canada.

Reports on health research in a general style. Nutrition topics are frequently included, as are fitness, lifestyle and prevention. Formerly Health. SOURCE: Health League of Canada, 1560 Bayview Avenue, Suite 304, Toronto, Ontario M4G 3B9

RUNNER'S WORLD 1965- (Monthly) $14.95/year. Mountain View: Runner's World Magazine Co., Inc.

Several nutrition articles are included in each issue. The information is generally reliable, but dietary aids not generally accepted by science are sometimes emphasized. SOURCE: Runner's World, Box 366, Mountain View, California 94042

RUNNING AND FITNESS 1968- (Bimonthly) $20.00/year membership. Washington: American Running and Fitness Association.

Excellent, detailed articles on nutrition are included in every issue. Material is consistently responsible and intelligent. Encompasses the synergistic concept of fitness and nutrition as lifestyle factors. Formerly The Jogger. SOURCE: American Running and Fitness Association, 2420 K Street, N.W., Washington, DC 20037

RUNNINGTIMES 1975- (Monthly) $17.50/year. Woodbridge, Virginia: Running Times.

Emphasis on the relationships between nutrition, wholistic health and fitness are emphasized without involving fads or hype. Covers nutrition topics often. SOURCE: Running Times, Subscription Department, P.O. Box 6509, Syracuse, New York 13217

SHAPE 1981- (Monthly) $20.00/year. Woodland Hills, California: Shape Magazine, Inc.

Although models dressed in frilly leotards grace the pages of this magazine, the nutrition articles in each issue are basic and reliable. Written by registered dietitians, the articles cover weight control and general nutrition topics. The emphasis is on beauty and weight control. SOURCE: Shape, P.O. Box 2516, Santa Ana, California 92707

SPORTS-NUTRITION NEWS 1982- (Bimonthly) $18.00/year. Evanston: Healthmere Press, Inc.

One research article per issue. Question/answer section, recipes, news briefs and book reviews are also included. SOURCE: Sports-Nutrition News, P.O. Box 986, Evanston, Illinois 60204

WEIGHT WATCHERS 1968- (Monthly) $6.00/year. New York: Family Media, Inc.

A reliable source of news, recipes and diet plans. SOURCE: Family Media, Inc., 149 Fifth Avenue, New York, New York 10010

YOUR LIFE AND HEALTH 1904- (Monthly) $18,95. Washington: Review and Herald Publishing.

Reliable nutrition articles, many authored by registered dietitians, are included in many issues. A regular vegetarian cooking column is included. Occasionally, entire issues on nutrition are featured. This magazine originated with the Seventh-day Adventists. Formerly Life and Health. SOURCE: Life and Health, Circulation Department, 6856 Eastern Ave., N.W., Washington, D.C. 20012

II. Professional Periodicals

AAFDBI FITPRINTS - BULLETIN OF FITNESS RESEARCH 1983- (Monthly) Cost not known. Stamford: American Association of Fitness Directors in Business and Industry.

Abstracts of current research are cited in this index. Nutrition topics are frequently reported. SOURCE: Fitprints, P.O. Box 8236, Stamford, Connecticut 06905

AMERICAN JOURNAL OF SPORTS MEDICINE 1972- (Bimonthly) $22.00/year. Baltimore: Sports Medicine Publications.

Occassional articles relating nutrition to sports medicine topics. Formerly Journal of Sports. SOURCE: Sports Medicine Publications, 428 E. Preston St., Baltimore, Maryland 21202

BIHEP-BIBLIOGRAPHIC INDEX OF HEALTH EDUCATION PERIODICALS 1980- (Annually) Write for price. Bloomington, Indiana: Indiana University.

The literature on diet, physical fitness and other elements of lifestyle is indexed in this periodical. SOURCE: Department of Health and Safety Education, HPER Bldg., Room 116, Indiana University, Bloomington, Indiana 47405

CONTEMPORARY NUTRITION 1976- (Monthly) Free in U.S., $5.00 in Canada. Minneapolis: General Mills.

This presents brief articles on frequently controversial nutrition issues, written by distinguished authors. Lengthy references often follow the articles. SOURCE: G.T. Florey, Assistant Editor, Contemporary Nutrition, General Mills, Inc., P.O. Box 1112, Dept. 65, Minneapolis, Minnesota 55440

CURRENT AWARENESS IN HEALTH EDUCATION 1978- (Monthly) $24.00/year. Atlanta, Georgia: U.S. Department of Health and Human Services.

Abstracts both literature and on-going programs in the health education field. SOURCE: U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402

CURRENT HEALTH 1978- (10/year) $4.50/year. Highland Park, Illinois: Curriculum Innovations, Inc.

Designed for school teachers responsible for health education. Available for grades 4-7 and 7-12. Each issue features fitness, nutrition and lifestyle topics. SOURCE: Curriculum Innovations, Inc., 3500 Western Avenue, Highland Park, Illinois 60035

DAIRY COUNCIL DIGEST (1930?)- (Bimonthly) $2.50/year. Rosemount, Ill.: National Dairy Council.

Issues present "an interpretive review of recent nutrition research". Each contains one main research article (with extensive references) and abstracts from selected professional nutrition journals. SOURCE: National Dairy Council, 6300 N. River Road, Rosemount, Illinois 60018

EMPLOYEE HEALTH AND FITNESS - THE EXECUTIVE UPDATE ON HEALTH IMPROVEMENT PROGRAMS 1979- (Monthly) $87.00/year. Atlanta: American Health Consultants, Inc.

Reports on programs, research and resources. Frequent nutrition coverage. SOURCE: Employee Health and Fitness, 67 Peachtree Park Drive, N.E., Atlanta, Georgia 30309

EXERCISE AND SPORT SCIENCES REVIEWS 1973- (Annually) $25.00/year. Madison: The American College of Sports Medicine.

Reviews current research in the exercise and sport areas with occasional related nutrition coverage. Contributing authors are specialists in their fields. SOURCE: The Franklin Press, Box 2266, Philadelphia, Pennsylvania 19103

FITNESS LEADER 1982- (10/year) $43.50/year. Ottawa: Pitters Publishing.

Designed for fitness professionals, this newsletter provides mainly program suggestions. Occasional nutrition coverage. SOURCE: Fitness Leader, c/o Pitters Publishing, 251 Bank Street, Suite 405, Ottawa, Ontario K2P 1X3

THE FITNESS REPORT 1980- (Monthly) $70.00/year. Toronto: Basquill-Elson, Inc.

Reports on research, programs and resources in the fitness field. Regular nutrition coverage. SOURCE: The Fitness Report, 102 Adelaide Street East, Toronto, Ontario M5C 1K9

HEALTH EDUCATION (196-?)- (Quarterly) Free. Ottawa: Health Promotion Directorate, Health and Welfare Canada.

Issues consist of feature and review articles, conference reports, news items, short reviews of new publications and audio-visual materials for a wide variety of health topics. SOURCE: Health Promotion Directorate, Health Services and Promotion Branch, Department of National Health and Welfare, Ottawa, Ontario K1A 1B4

HEALTH, PHYSICAL EDUCATION AND RECREATION MICROFILM PUBLICATIONS BULLETIN 1949- (Supplement Published Biannually). Free. Eugene, Oregon: College of Human Development and Performance, University of Oregon.

Catalog of dissertations and theses available on microfiche. Includes many nutrition-related studies. SOURCE: Microfilm Publications, College of Human Development and Performance, University of Oregon, Eugene, Oregon 97403

HEALTH VALUES: ACHIEVING HIGH LEVEL WELLNESS 1977- (Bimonthly) $16.00/year. Thorofare, New Jersey: Charles B. Slack, Inc.

Occasionally, entire issues are devoted to nutrition or fitness-related topics. SOURCE: Charles B. Slack, Inc., 6900 Grove Road, Thorofare, New Jersey 08086

JOURNAL OF APPLIED NUTRITION 1947- (Semiannually) $10.00/year. La Habra, Calif.: International College of Applied Nutrition.

The official publication of ICAN, this contains research and review articles in the field of applied nutrition. Priority is given to scientific papers of unpublished, original research. Information is at a professional level for doctors, dentists, veterinarians and nutrition specialists. SOURCE: International College of Applied Nutrition, Box 386, La Habra, California 90631

JOURNAL OF NUTRITION EDUCATION 1969- (Quarterly) $20.00 for individuals in the U.S.A., $22.00 U.S. for individuals in Canada and abroad, $25.00 for institutions in the U.S.A., $27.50 for institutions in all other countries. Berkeley, Calif.: Society for Nutrition Education.

This is the official journal of the Society for Nutrition Education, an organization whose goal is "to promote nutritional well-being for all people through education, communication, and education-related research". It includes short articles describing nutrition concerns and innovative approaches to problems, longer discussions of research and programme evaluations, news items, and reviews of numerous books and educational materials. SOURCE: Subscription Department, Society for Nutrition Education, 2140 Shattuck Avenue, Suite 1110, Berkeley, California 94704

JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION 1925- (Monthly) $27.50 U.S./year in the U.S.A., Canada and countries of the PUAS, $33.50 U.S./year in all other countries, $1.00 per month for students with letter of validation from their faculty. Chicago: American Dietetic Association.

"The Journal publishes referred reports of original research and other papers covering the broad aspects of dietetics, including nutrition and diet therapy, community nutrition, education and training, and administration." As well as research and feature articles, each issue contains news from the field, changes in legislation relating to nutrition programmes and practice, and detailed reviews of numerous new books, journal articles and audio visual items. SOURCE: The American Dietetic Association, 430 North Michigan Avenue, Chicago, Illinois 60611

JOURNAL OF THE CANADIAN DIETETIC ASSOCIATION 1939- (Quarterly) $10.00/year in Canada and the U.S.A., $14.00 in other countries, $5.00 for undergraduate students and dietetic interns. Toronto: Canadian Dietetic Association.

As the official journal of the Association, this "publishes reports of original research and other papers, covering the broad aspects of dietetics, including nutrition and diet therapy, community nutrition, education and training, and administration". Articles focus on therapeutic and community nutrition rather than theoretical research. News from across Canada and from conferences and signed book reviews are included. SOURCE: The Canadian Dietetic Association, 7 Pleasant Boulevard, Toronto, Ontario M4T 1K2

JOURNAL OF SPORTS MEDICINE AND PHYSICAL FITNESS 1961- (Quarterly) $50.00/year. Turin, Italy: International Federation of Sportive Medicine.

Reports on research in the field with nutrition-related coverage included occasionally. SOURCE: J. B. Lippincott Company, E. Washington Square, Philadelphia, Pennsylvania 19105

MEDICINE AND SCIENCE IN SPORTS AND EXERCISE 1969- (Bimonthly) $40.00/year. Madison: The American College of Sports Medicine.

Reports on sports and exercise research, with nutrition topics included as part of the field. Formerly Medicine and Science in Sports. SOURCE: American College of Sports Medicine, 1440 Monroe Street, Madison, Wisconsin 53706

NATIONAL STRENGTH AND CONDITIONING ASSOCIATION JOURNAL 1979- (Bimonthly) $14.00/year. Lincoln, Nebraska: National Strength and Conditioning Association.

Most issues include research articles on nutrition as it relates to strength and conditioning training. SOURCE: National Strength and Conditioning Training Association, 251 Capitol Beach Blvd., Lincoln, Nebraska 68528

NUTRITION ABSTRACTS AND REVIEWS SERIES A: HUMAN AND EXPERIMENTAL. 1977- (monthly) £170.00 for subscribers in countries that are not members of the Commonwealth Agricultural Bureaux (such as the U.S.A.); special rates to subscribers in CAB member countries such as Canada, Aberdeen: Commonwealth Bureau of Nutrition.

Abstracts are drawn from articles in over 8,500 international serials and other scientific publications. This is "the only comprehensive coverage in English of the world literature" in the field. Nutrition Abstracts covers food types and sources, components, processing and storage, human physiology and biochemistry, health and nutrition, and therapeutic nutrition. It also includes book reviews and reports. Extensive subject and author indexes are provided for each issue, with separate yearly cumulative indexes. SOURCE: Central Sales, Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Slough SL2 3BN, U.K.

NUTRITION AND THE M.D. 1974- (Monthly) $35.00/year. Van Nuys: P.M., Inc.

Covers current concerns relating to fitness, athletics and lifestyle and the role of nutrition. SOURCE: P.M., Inc., 6931 Van Nuys Blvd., Box 2160, Van Nuys, California 91405

O.N.E. NEWSLETTER 1980 - (Quarterly) $20.00/year for professional membership, $7.50 for student membership. Guelph, Ontario: Organization for Nutrition Education.

Professionals in the field author short articles for this newsletter about a wide variety of topics relating to nutrition education. One key article per issue focuses on a current concern; other regular columns include news about current and future Canadian projects and nutrition programmes, research news, meeting announcements, activities of the Organization, and reviews of new resources. SOURCE: Organization for Nutrition Education, P.O. Box 818, Guelph, Ontario N1H 6L8

PHYSICAL EDUCATION INDEX 1978 - (Quarterly) $125.00/year. Cape Girardeau, Missouri: Ben Oak Publishing Company.

Indexes and abstracts literature in the field of physical education, including related nutrition topics. SOURCE: Ben Oak Publishing Company, Box 474, Cape Girardeau, Missouri 63701

PHYSICAL FITNESS/SPORTS MEDICINE 1978- (Quarterly) $6.00/year. Washington: President's Council on Physical Fitness and Sports.

Abstracts current research in the field, with nutrition-related coverage. SOURCE: U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20401

PHYSICIAN AND SPORTS MEDICINE 1973- (Monthly) $28.00/year. New York: McGraw Hill.

Research articles on nutrition as it relates to sports medicine are frequently included. SOURCE: McGraw Hill Publications Co., 1221 Avenue of the Americas, New York, New York 10020

PROFESSIONAL NUTRITIONIST 1969- (Quarterly) Free. San Francisco: Foremost-McKesson, Inc.

This is "a professional service publication" of the Foremost-McKesson Food Group. Short articles by Foremost-McKesson researchers and university professors in food science and nutrition. Subjects cover a wide variety of nutrition and related topics: life cycle, education, additives, energy, and consumerism. SOURCE: Foremost-McKesson, Inc., One Post St., Suite 3275, San Francisco, California 94104

PROMOTING HEALTH 1980- (Bimonthly) $24.00/year in U.S.A. and Canada. Chicago: American Hospital Association.

This provides short feature articles, idea exchanges and information about new literature, reports, kits and audio visual materials. It is "the inside-hospitals story of what is going on in health promotion...the first publication directed specifically to those involved in hospital-based health promotion activities...a practical tool for practitioners and decision-makers involved in patient education, community health. and employee health programs". SOURCE: American Hospital Association, Attn: Circulation Department, 840 N. Lake Shore Drive, Chicago, Illinois 60611

RESEARCH QUARTERLY FOR EXERCISE AND SPORT 1930- (Quarterly) $30.00/year. Reston, Virginia: American Alliance for Health, Physical Education, Recreation and Dance.

Occasional research articles on nutrition-related topics are included. Formerly American Alliance for Health, Physical Education and Recreation Research Quarterly. SOURCE: American Alliance for Health, Physical Education, Recreation and Dance, 1900 Association Dr., Reston, Virginia 22091

SCHOLASTIC COACH 1930- (10/year) $11.50/year. Chicago: Scholastic Magazines, Inc.

Nutrition-related articles dealing with weight training and conditioning are occasionally included. Formerly Coach and Athlete. SOURCE: Scholastic, Inc., 50 West 44th St., New York, New York 10036

SPORT AND RECREATION INDEX 1973- (8/year) $25.00/year. Ottawa: Sport Information Resource Centre.

Indexes and abstracts current research in the sports and recreation areas. Nutrition is a regular descriptor term. SOURCE: SIRC, 333 River Road, Ottawa, Ontario K1L 8H9

SPORT BIBLIOGRAPHY 197?- (Irregular) $175.00/8 volume set - annual updates available. Ottawa: Sport Information Resource Centre.

Over 70,000 citations from the Sport Data Base. Nutrition is a topic in Volume 8. SOURCE: SIRC, 333 River Road, Ottawa, Ontario K1L 8H9

C. ORGANIZATIONS

Over 100 letters of inquiry were mailed to health, nutrition, weight control, fitness and athletic organizations identified through various directories of organizations. Despite the current interest in and concern for lifestyle issues, many of these organizations have no nutrition component; these were not included here. Numerous others distribute unreliable nutrition information - promoting excessive use of vitamins, minerals, protein powders and other questionable practices. Those organizations which responded and which were judged to be reliable sources of information on nutrition are included in the following list. Selected organizations located in the files of the Nutrition Information Service are also cited.

ACTIVETICS INC.
8 Winlock Park
Willowdale, Ontario
M2M 1Z2
(416)223-3077

A representative for "Fitness Finders Library of Resource Information", Activetics distributes reliable fitness-related cost publications.

THE AMERICAN COLLEGE OF SPORTS MEDICINE
1440 Monroe Street
Madison, Wisconsin 53706
(608)262-3632

Annual meeting, scientific journal, newsletter, position statements, monographs, and continuing education and awards programs are some of the services available to members. Nutrition is often included as a topic in publications and meetings.

THE AMERICAN DIETETIC ASSOCIATION
430 North Michigan Avenue
Chicago, Illinois 60611
(312)280-5000

Publishes position statements, a monthly journal and various other publications; some of the material focuses on lifestyle-related nutrition topics, including fitness and sport.

AMERICAN RUNNING AND FITNESS ASSOCIATION
2420 K Street, N.W.
Washington, DC 20037
(202)965-3430

Publishes a newsletter with frequent, reliable articles on nutrition. Members receive free medical advice and access to a clearinghouse of information.

BIKECENTENNIAL-THE BICYCLE TRAVEL ASSOCIATION
P.O. Box 8308
Missoula, Montana 59807
(406)721-1776

Distributes numerous nutrition and cooking books for cyclists. Publishes a bimonthly magazine which includes a nutrition article in each issue.

THE CANADIAN DIETETIC ASSOCIATION
385 Yonge Street
Toronto, Ontario
M5B 1S2
(416)595-0857

Source of reliable nutrition information; involved in the annual "Nutrition Month" campaign. Publishes a scientific journal.

CANADIAN PAEDIATRIC SOCIETY
Nutrition Committee
Centre Hospitalier Universitaire
Sherbrooke, Quebec
J1H 5N4
(819)563-9844

Publishes position statements, reports and a scientific journal; all have occasional nutrition/lifestyle/fitness content.

FITNESS AND AMATEUR SPORT
Government of Canada
365 Laurier Avenue West
Ottawa, Ontario
K1A 0X6
(613)996-4510

Promotes lifestyle, fitness and sport programs. Produces and distributes educational materials; some have nutrition-related themes.

THE FITNESS INSTITUTE
255 Yorkland Blvd.
Willowdale, Ontario
M2J 1S3
(416)492-7607

Through their medical clinic, provides nutrition counselling, assessment and seminars. Produces a monthly newsletter with consistent nutritional content. Various other publications are available.

THE FITNESS WORKS
213 St. Clair Avenue West
Toronto, Ontario
M4V 1R3
(416)924-3844

Counselling, assessment and programs available to members. Also undertakes workshops, presentations, employee fitness programs and consultation services.

HEALTH LEAGUE OF CANADA
1560 Bayview Avenue, Suite 304
Toronto, Ontario
M4G 3B9
(416)486-6023

Advocates healthy lifestyle through education. Publishes a bimonthly newsletter with extensive nutrition/lifestyle/fitness content.

HEALTH AND WELFARE CANADA
Health Promotion Branch
Tunney's Pasture
Ottawa, Ontario
K1A 1B4

Produces and distributes educational material relating to nutrition and lifestyle. Provides funds for research in this area.

NATIONAL ATHLETIC HEALTH INSTITUTE
575 East Hardy Street
Inglewood, California 90301
(213)674-1600

Conducts seminars in the sports medicine area; nutrition is a frequent topic. A sports medicine clinic undertakes assessment of athletes, including nutrition and preventative counselling. A library is available and various publications are distributed.

NATIONAL ATHLETIC TRAINERS ASSOCIATION
1001 East Fourth Street
P.O. Drawer 1865
Greenville, North Carolina 27834
(919)752-4870

Promotes general nutrition knowledge to athletic trainers in terms of answering athlete's questions and formulating dietaries.

NATIONAL HIGH SCHOOL ATHLETIC COACHES ASSOCIATION
3423 East Silver Springs Blvd., Suite 9
Ocala, Florida 32670
(904)622-3660

Seminars on nutrition are a frequent feature at member's meetings.

ONTARIO MINISTRY OF TOURISM AND RECREATION
Fitness Services Unit (Fitness Ontario)
77 Bloor Street West, 8th Floor
Toronto, Ontario
M7A 2R9
(416)965-6311

Promotes fitness and improved nutrition habits through media promotion, award programs, brochures and the incorporation of nutrition in leadership development programs.

ORGANIZATION FOR NUTRITION EDUCATION
P.O. Box 818
Guelph, Ontario
N1H 6L8

Publishes position statements and a quarterly newsletter outlining Canadian programs and general nutrition topics.

PARTICIPACTION
80 Richmond Street West, Suite 805
Toronto, Ontario
M5H 2A4
(416)361-0514

An employee fitness package program is available. Posters, booklets and other publications are distributed.

SOCIETY FOR NUTRITION EDUCATION
1736 Franklin Street
Oakland, California 94612
(415)444-7133

Publishes a quarterly journal with concentrates on nutrition education research. A large portion of the journal is devoted to reviews of nutrition resources. Bibliographies are produced and distributed, including one on nutrition and fitness.

SPORT INFORMATION RESOURCE CENTRE
333 River Road
Ottawa, Ontario
K1L 8B9
(613)746-5357

Maintains a vast collection of sport-related information on a computerized data base. Computer searches, document reproduction, reference assistance, book loans and reference guides are provided. Publishes a bimonthly index, a bibliography and other publications.

THE SPORTSMEDICINE CLINIC
1551 N.W. 54th Street, Suite 200
Seattle, Washington 98107
(206)782-3383

Individual nutritional guidance, seminars and classes are available.

UNITED STATES OLYMPIC COMMITTEE
Sports Medicine Division
1750 East Boulder Street
Colorado Springs, Colorado 80909
(303)632-5551

Conducts research into nutrition and athletic performance, lectures on nutrition, and provides nutrition assessments of athletes. A clearinghouse library is available.

WOMAN'S SPORTS FOUNDATION
195 Moulton Street
San Francisco, California 94123
(415)563-6266

Provides an information library, referrals, symposia, book club and other services; nutrition is considered. Pamphlets and books on nutrition are available. Some of the pamphlets distributed promotes unproven theories, including vitamin and mineral megadoses.